# Telephony

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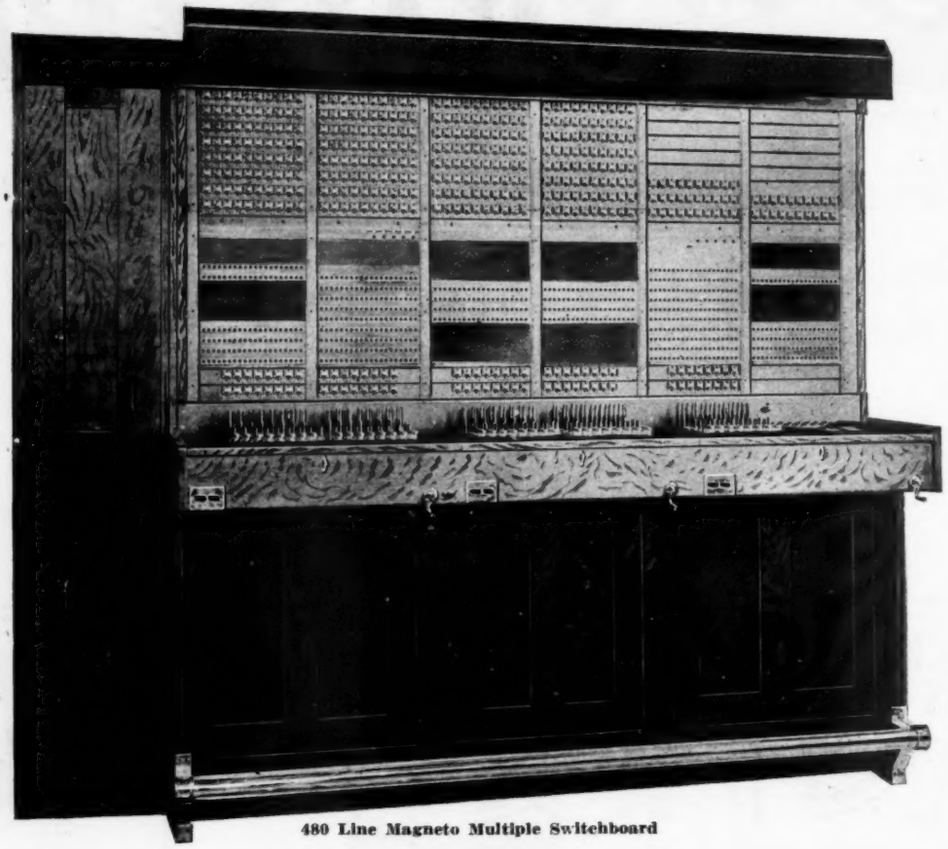

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# Telephony.

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## CURRENT OPINIONS AND COMMENTS

As we enter the New Year the word we hear most often on every hand is "readjustment." Theoretically, the United States has been "readjusting" ever since armistice day, November 11, 1918, but it is only within recent months that most people, feeling the pinch of slackening business, have come to understand by experience what "readjustment" really means.

Many complacently believed that it meant lower prices of the commodities they had to buy with no reduction in their own incomes, and that they would, therefore, have a bigger margin of profit or savings.

This may have been the experience of a comparative few, but, generally speaking, the process of deflation has not operated without causing anxiety. In fact, this was unavoidable, and no sensible man could expect otherwise, for he knows that deflation means a "letting down."

* * * *

The lower prices that the public used to yearn for, when it was paying 22 cents a pound for sugar and $8 a ton for a poor grade of soft coal, have arrived, but they have been accompanied by some companions less welcome, such as slack business, cancelled orders and unemployment.

Far-sighted business leaders say this condition was inevitable, and that it will lead to a safe, solid readjustment of affairs. These financial and industrial forecasters declare that the worst is over, and that from now on business undertaken will be on a sound deflated basis instead of on an unsound inflated basis.

Nobody has any patience with the foolish trumpeting of the professional boomer or the unthinking so-called optimist, whose only motto is "Boost, don't knock," but there is good logic in the reasoning of the business leaders who see prosperity just around the corner.

They point out the manifold opportunities awaiting enterprise in the long-restricted building industry, the postponed rehabilitation of the railroads and the holding back of commercial development generally. They are confident those opportunities will be grasped and that activity will result.

* * * *

At the beginning of the New Year, the best minds of the nation are studying the question, how to meet the situation and speedily restore conditions under which the country can proceed prosperously and safely. One of the best prescriptions that has come to notice is contained in the following paragraph from an Eastern financier:

"All of us can accelerate the curative movement by practicing and preaching the doctrine of work and saving, by revising our burdensome and paralyzing war-time taxation—which is no longer necessary—, by contenting ourselves with returns more nearly commensurate than recently with the service performed, and that applies equally to capital and labor.

"We must look for profits from big production, not from limitation of production. We must see to it that the present mass readjustment of prices is carried through to the ultimate consumer."

In words of one syllable this means: Go to work, be thrifty, economize in government expenditures, stop the profiteering by both capital and labor. It sounds like a sensible program.

* * * *

"Resolved, that before 1921 is much older we will take steps to have our rates put on a fair basis."

This is a New Year's resolution that all telephone companies should make—and not only make but carry out. No development of the year just closed has been emphasized more forcibly than the tendency on the part of commissions to treat public utilities with a greater degree of fairness than ever before.

More rate increases have been entered during the last twelve months probably than in any three years since public service corporations have been subject to regulation. Exact information on this point is not available, but there is no mistaking the increasing belief on the part of both rate-makers and the general public that the utilities must have more revenue if they are to function satisfactorily.

With this fact repeated again and again, it is incomprehensible why more telephone companies have not taken advantage of the favorable conditions. In an address before the Illinois convention President F. B. MacKinnon, of the

United States Independent Telephone Association, made the statement that of the 558 telephone companies in the state, operating 1,041 switchboards, only 265 companies (operating 513 exchanges) have raised their rates since January 1, 1914, when the utility commission was established.

This means that more than half of the Illinois companies are operating on old rates that date back long before the war caused such a jump in operating expenses. That they are still in existence and furnishing good service speaks volumes for their thrifty management, but does not alter the fact that the men in charge of these plants are justly entitled to more compensation, and that they should not force themselves to scrimp along on inadequate rates.

Another strong reason why they should demand fair rates is that when they fail to do so they, by force of example, handicap neighboring companies in obtaining needed rate increases.

* * * *

This year—1921—should see a tremendous growth in telephone development. The demand for service exceeds all previous records, and is only limited by the ability of the companies to finance extensions and of the manufacturers to supply the equipment.

As frequently stated in these columns, it is the primary duty of the men in charge of the telephone industry to bend every energy toward filling this demand for service. It is up to the operators and manufacturers—both Independent and Bell. It is, of course, also up to the commissions to see that rates are forthcoming to permit the necessary extensions and replacements. The right kind of co-operation among these factors, insuring a square deal for them and for the public, will solve the problem.

**A NEW YEAR THOUGHT.**

**With the coming of the New Year many and varied are the remedies proposed to promote prosperity, establish justice and smooth out the rough spots—in short, to make this a better world to live in. No movement toward this end can be permanently effective however, unless it is founded on friendliness.**

**Whole-hearted cultivation of genuine "good will among men" is what is needed to lift us along the road to national happiness. Friendliness softens the rough edges of human contact, and persuades us to judge the other fellow more kindly. Not every one, perhaps, can be our friend in the deepest sense, but we can be friendly to everybody and if all of us sincerely practiced that one simple rule most of our troubles would vanish.**

**TELEPHONY wishes its readers in 1921 a year of good health, constructive development and personal happiness. As in the past this journal will do its level best to contribute to the success of the telephone industry. The public demand for service today is greater than ever before known. Let all co-operate to meet this opportunity efficiently.**

Every so often some statistical expert or so-called scientist explodes a hair-raising statement calculated to cause alarm or—which is more likely—make himself and his theory talked about. A professor in an Eastern university "sprung" one the other day to the effect that his investigations showed that by the year 2100 the United States will have a population of 197 millions of people which, he says, will be the limit the country can support. In support of this idea the professor—who possesses the unusual name of Raymond Pearl—states that it will take 260 trillion calories of food to support such a population, and according to the production of the last seven years it would be necessary to import about half that number of food units to sustain the 197 millions.

* * * *

It is interesting guess-work, and has brought out a storm of contradictory evidence that is no less interesting. It is pointed out that Japan sustains 77 million people on one-tenth the area of the United States, which, therefore, could feed more than three times the limit set by Prof. Pearl. If Texas alone were intensively cultivated it is estimated that state could feed the entire population of the world—some 1,500 million people. Anyway, why burn midnight oil to concoct theories showing the human race starving to death for lack of a sandwich? The professor and his co-workers might better use their brains to develop some plan to increase the food supply.

Besides, telephone men would be more interested in figures showing how many telephones the United States will have when its census counts 197 million inhabitants.

# Awarded Edison Medal for 1920

## Dr. M. I. Pupin, of Columbia University, Originator of the Famous Loading Coil, Receives Honor for Achievements in Electrical Science—Presentation to Be Made at the A. I. E. E. Convention, February 18

Dr. M. I. Pupin, originator of the Pupin loading coil, which has been such an important factor in the development of long distance telephony, has been awarded the Edison Medal for the year 1920 "for work in mathematical physics and its application to the electrical transmission of intelligence."

The medal was awarded to Dr. Pupin by the Edison Medal Committee of the American Institute of Electrical Engineers at a recent meeting and is to be presented to him at a session of the midwinter convention of the institute, to be held in New York the evening of February 18.

The Edison Medal was founded by the Edison Medal Association, composed of associates and friends of Thomas A. Edison, and is awarded anually by a committee consisting of 24 members of the A. I. E. E. "for meritorious achievement in electrical science, electrical engineering, or the electrical arts."

Michael Idvorsky Pupin was born in 1858 in Idvor, Banat, Hungary, now forming part of the kingdom of the Serbs, Croatians and Slovians.

After completing his education at the village school and showing unusual

talents, he was sent to Prague, Czecho-Slovakia, to continue his education in studies preparatory for higher education. He ran away from Prague and came to America; landed in New York in 1874, and after five years' struggle for existence saved up enough money to enter Columbia College, where he graduated with high honors in 1883, with a B. A. degree.

He then went to Europe for the purpose of taking up graduate work in physics and mathematics at the University of Cambridge, England, and at the University of Berlin, Germany, and after taking a Ph. D. at Berlin returned to Columbia University where, together with Prof. F. B. Crocker, he started in 1889 the Electrical Engineering Department as instructor in mathematical physics.

His principal study in Berlin was physical-chemistry, but owing to the fact that physical-chemistry at that time was a new science at the universities in the United States, it was not possible to continue his researches in this science at Columbia and he turned his attention to researches in electrical science.

Dr. Pupin's earliest work was devoted to the study of the passage of electricity through rarefied gases and several papers concerning the results were published. In 1892 he took up the subject of electrical resonance, which resulted in the invention of the employment of tuned circuits for selective electrical reception of signals.

The expression "electrical tuning" was invented by him at that time and is used in the art today. Also resonance analysis by tuned circuits was worked out by him, employing for means of selectivity by tuning, circuits of variable inductance and variable capacity. The inventions resulting were acquired by the American Marconi Wireless Co. in 1902.

In 1895-6 he developed a method of rectifying both low and high frequency oscillations so as to make them detectable by d-c. instruments. The rectifier consisted of a polarized electrolytic cell, and it was clear to him at that time that rectification was a very important element in wireless telegraphy, an opinion which has been wonderfully justified by the developments in the wireless art which have taken place within the last 25 years.

The subject of electrical wave transmission over long conductors began to occupy Dr. Pupin's attention as early as 1894, and his earliest work in this direction was chiefly mathematical, and it resulted in an extension of the great problem of LaGrange, namely, the problem of analyzing the motion of a stretched weightless string carrying at equal intervals of its length equal masses. Pupin extended the solution of this problem by supposing that the string itself had weight and that both the string and the masses moved against frictional resistance, taking into consideration not only the free vibrations of the string but also the forced motion produced in it by impressing upon it a simple harmonic force.

The solution of this purely dynamical problem suggested immediately its applicability to transmission of electrical waves over telephone wires and it was obvious that the introduction of suitable inductance coils at pre-determined distances along the telephone line would greatly improve the efficiency of transmission by making it possible to transmit the electrical energy carrying the articulate voice of man by high potential and small current, thus reducing ohmic resistance losses on the line.

The invention was acquired by the American Telephone & Telegraph Co. in

**M. I. Pupin, Originator of Famous Loading Coil, Awarded 1920 Edison Medal.**

January 1901, after this company had convinced itself that the invention was capable of performing those things which the theory had claimed for it. The practical applicability of this invention required the knowledge of making highly efficient inductance coils, using iron cores very finely laminated, and Pupin devoted a study of several years to the investigation of these iron losses, resulting in the design of the toroidal coil, known all over the world as the Pupin coil.

During the war Dr. Pupin served on several national committees connected with war work, particularly the National Advisory Committee for Aeronautics and the National Research Council, and with a government committee for submarine detection, which had its headquarters at New London.

**Submarine Detector Developed.**

Pupin and his staff were engaged in developing a method of submarine detection by means of very high-frequency sound waves sent out by a panel of vibrating quartz plates. Since the wave length of these sound waves in water was small in comparison with the dimensions of the vibrating plate, the sound waves were concentrated in a beam similar to the light beam sent out by a searchlight. The detection consisted in receiving an echo from a submerged submarine, and it is the only means which enables one to detect submarines which are at rest, determining not only the direction but also the distance of the submarine.

In prosecuting this work Dr. Pupin developed a multi-step vacuum tube amplifier which is free from internal noises and which does not transmit low frequency under-water noises. This work is now in charge of the United States Navy.

Pupin's work in wireless telegraphy has always occupied his attention, being interrupted now and then by other scientific engagements due to his connection with several national committees. The results of this work were recently acquired by the Westinghouse Co. The principal feature in this work is the so-called negative resistance compensator, which according to competent opinion is destined to play a very important part in the wireless art.

Professor Pupin is a member of the National Academy of Sciences, of the National Research Council, of the Serbian Academy of Sciences, and of many other learned societies, and has been a Fellow of the American Institute of Electrical Engineers for many years. He has received from the French Academy the Herbert Prize in Physics, and from the Franklin Institute the Carson Gold Medal, also the Gold Medal from the Social Science Association. He also holds honorary degree of Doctor of Science, Columbia University, and the honorary degree of Doctor of Laws of Johns Hopkins University.

He is now professor of electro-mechanics, Columbia University, and is director of the Phoenix Research Laboratory of the same university.

## Peak in Operating Costs of Utilities Believed Reached.

Operating costs of public utilities have reached the peak and in some cases the highest level has been passed, accordto the annual report of the Indiana Public Service Commission, which has just been completed. A year ago costs were constantly increasing, the report points out, but at the present time conditions have changed.

"During the past year," the report says, "there has been no decline in operating costs to utilities. Until quite recently operating costs continued to increase. At this time the commission is inclined to believe the peak has been reached and passed, and that the price of materials and fuel will reach more normal levels."

One of the chief factors entering into the increased operating costs to utilities, according to petitions filed with the commission in rate cases, has been the excessive cost of coal. This item, according to the statements of the utilities, has soared so as to present a serious problem under normal times. The commission, according to the report, is of the opinion that coal costs will come down soon.

A marked decline in the prices of many of the materials used by various utilities is noted by the Indiana commission.

"Copper, which is used in large quantities in electric bus bars," says the report, "and electric transmission and distributing systems is suffering a marked drop, and apparently will soon reach a point as low as before the world war.

"Cedar poles have continued to go upward in price, due to depletion of the supply and the continued market demand, but apparently even the price of poles has reached the top, for there is rumor among the trade of an impending drop in the price. Prices of cross-arms are expected to take a 20 per cent drop soon.

"Wages have not fallen, but we have noted a tremendous increase in the efficiency of labor due to the fact that there are more men than jobs and also to the fact that now managements can choose their own men instead of being forced to take what they can get.

"As replacement and depreciation require labor and material at present-day prices, we believe that the time is coming when we will be able to observe a decrease in the costs of operation in so far as the depreciation item and the general labor item may contribute to the operating costs.

"It is fair to say that while we see no immediate possibility of decrease in operating costs, we can take some satisfaction in indications that the top has been reached, in some cases even passed. This observation is made with pleasure both for the owners of public utility plants and for consumers of public utility plants and for consumers of public utility service, especially since we have passed through four years of frenzied increases in prices of everything entering into the costs of public utility operation."

Great difficulty has been experienced by the commissions, acording to the report, in establishing utility rates which would meet the high costs of operation and at the same time not be prohibitive.

"The commission was constantly confronted," says the report, "with the difficulty of establishing rates which would be sufficient to prevent the absolute breakdown or abandonment of service, and at the same time would not be so disproportionate to the value of the service to the consumer as to cause a loss of patronage."

## PERSONALITY

### By Miss Anne Barnes.

*Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa.*

**It is so easy to grow into the habit of mechanically serving in any line of work where there is an authorized routine to follow, and especially so in telephone operating.**

**For the very fact that we are not visible to our patron, or he to us, we often allow ourselves to drift into the habit of talking AT OUR PATRON rather than to him. The patron misses the interest element in our voice. Then we sometimes wonder why he apparently, or pointedly, doubts our word when we report a telephone "busy" or "don't answer."**

**We sometimes take exceptions to his insinuations of "It is strange that line is always busy," or "It is queer they don't answer."**

**Who is to blame, the patron or the operator?**

**Don't pick out your "chronic kicker" in fixing the blame, and please do not tell me that all of your patrons are unreasonable, for if you do, I will be sure to know at some time or other, they have not been served well. And please do not think my judgment harsh when I say that three times out of five, the operator is at fault. Why?**

**Because the operator has conveyed SOMETHING to her patron through the medium of her voice, in addition to the standard phrase which she has been taught to use, to fit the varying conditions of the call—and that something is detachment of self.**

**She has failed to put her personality into her service. The patron misses that quality, INTEREST, in what she says. He forms the impression that she is unconcerned.**

**Sometimes he takes her to task—we all know the result.**

**Sometimes he hangs up the receiver, mentally deciding that the service is very indifferent.**

**Is it fair to the rest of the employes in the organization to have their efforts labeled "indifferent"?**

**It surely is not fair.**

**The Plant Department prepares for the market the product which the operator sells. The Commercial Department bills the patron for the commodity which the operator sells.**

**The Operator is the Sales Lady employed by her company to sell the commodity, "Service," to its patron—and her patron.**

**All three departments have a common interest. They are three-in-one when judgment is passed—they must be three-in-one in their serving.**

**Let me repeat:**

**The operator must put her personality into her serving. What is her personality? It is HERSELF.**

**She must be natural and real to her patron, not as to the color of her hair and eyes—but her real self, who looks out of those eyes; who serves with those hands, who speaks with those lips.**

**Because—**

**The operator closes the deal.**

# Minimizing Inductive Interference

## Some Methods by Which the Inductive Effects of Power Lines Upon Telephone Lines May Be Reduced to a Minimum—Proper Balancing of Telephone Circuits—Paper Presented at Convention of Illinois Association

By J. G. Wray and Cyrus G. Hill

Inductive interference is the designation applied to electromagnetic induction when the property of electricity instead of being the servant which runs our machinery, goes wrong and plays havoc with our telephone circuits. Electromagnetic induction, the laws of which were unraveled by Faraday, may be illustrated, experimentally, as follows:

**Electromagnetic Induction.**

Two circuits, *A* and *B*, Fig. 1, are placed near together, but completely isolated from each other. Circuit *B* contains a galvanometer and circuit *A* a battery and key. Supposing circuit *A*, at the beginning of the experiment, to be interrupted, press down the key and close the circuit. The galvanometer in *B* will be momentarily deflected, indicating the passage of a current through *B*, although it is completely insulated from the battery.

The deflection of the magnet of the galvanometer in *B* indicates that an electromotive force of very short duration has acted around *B*, producing a current in a direction opposite to that started in *A*. After the motion of the magnet subsides, it will remain at rest although current continues to flow through *A*.

If we raise the key in *A* so as to stop the current flowing through the circuit, the galvanometer in *B* is again deflected, the direction of the first swing in this case being opposite to that which occurred upon starting the current in *A*, indicating an electromotive force around *B*, tending to start a current through *B* in the same direction as that which previously existed in *A*.

This experiment shows that the starting or stopping of the current in circuit *A* is accompanied by the production of another current in a neighboring circuit, *B*,

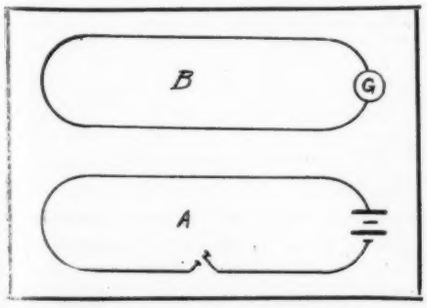



**Fig. 1. Two Parallel Untransposed Circuits.**

the current in *B* being in the opposite direction to that in *A* when the current is started, and in the same direction when the current is stopped.

Now twist circuit *B* one-half turn to form a figure 8, as shown in Fig. 2, the loops on each side of the mid-point being equal. Closing and opening circuit *A* by means of the key will now produce no deflection of the galvanometer in circuit *B*, since equal and opposite electromotive forces are produced in the two halves of circuit *B*. In this experiment we have a simple illustration of inductive interference on telephone circuits and the effect of transposition, Fig. 1 representing two parallel untransposed circuits, and Fig. 2 two parallel circuits, one of which has been properly transposed to reduce effects of induction.

**Inductive Interference Between Telephone Circuits.**

Before the days of general distribution of electric power over long distances at high voltages, a development of the last 15 years, telephone interference troubles were limited largely to induction between telephone circuits on the same lead. This difficulty, known as cross talk, was overcome in the case of metallic circuits by transposing the circuits in such a way that within each eight-mile length or less, each circuit inducted approximately equal and opposite voltages and currents in every other circuit.

The problem of eliminating cross talk on open wire lines has been so completely solved and the most effective arrangements of transposition so standardized, that the constructor of a telephone line has but to choose from diagrams of many transposition systems, those which best meet his requirements as to number of wires, grouping phantom circuits, and distances between points of discontinuity.

**Inductive Effects of Power Lines.**

In dealing with the inductive effects of power lines upon telephone circuits, the problem is complicated by the replacement of small, well-balanced telephone currents by power voltages and currents which are not only usually unbalanced, but of such magnitude that the effects of small unbalances in the telephone circuits are magnified. The voltages or currents of a power line are balanced if the Vector sum of the voltages or currents in all wires of the circuit at any point at the same instant is zero.

By a well-balanced telephone circuit is meant one in which the series impedances of the two line wires are nearly equal and the admittances to ground of the two sides of the circuit are approximately the same at every point. Theoretically, a perfectly balanced telephone circuit would be noiseless, no matter what voltages to ground were induced by neighboring power lines, since the voltages on the two telephone wires would everywhere be the same and there would be no tendency for current to flow between wires through the telephone receiver.

Although it is impossible to obtain a perfectly balanced telephone circuit, careful maintenance and the use of modern standard apparatus on a metallic circuit will give a sufficiently high degree of balance to reduce noise except under very severe conditions of outside induction.

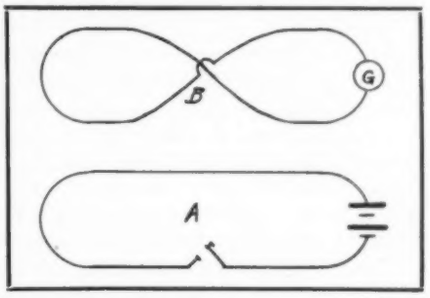



**Fig. 2. Two Parallel Circuits, One of Which Has Been Properly Transposed.**

**Balance of Telephone Circuit.**

In the treatment of the noise on metallic circuits, due to induction from power lines, the first consideration is, therefore, the balance of the telephone circuit.

Impedance unbalance may be caused by any of the following troubles: Defective or poorly designed central office apparatus; high-contact resistance in test connectors; bad joints in wires, particularly iron wires.

Admittance unbalances are usually due to defective or broken insulators, contact of line wires with trees, leakage at open-space cut-outs in cable boxes or in central office, cable lengths having capacity or insulation unbalances between cable conductors and ground.

The location and correction of such defects is a part of the regular maintenance routine of a well-maintained telephone plant and need not be described in detail here. In investigating noise, however, a simple method of determining whether the excessive interference is due to an unbalanced condition of the telephone line or to high induction from external sources is desirable.

**Noise Measurements.**

Such an easily applicable test is suggested by the fact that, if the telephone circuit is well-balanced, the noise produced in a telephone receiver between the line wires and ground will be very much greater than the noise when the receiver is

connected between the two sides of the circuit, whereas on a poorly balanced line these two amounts of noise will be more nearly equal. The ear unassisted is a poor judge of relative amounts of noise.

To put the observations on a scientific basis, we may either insert artificial cable in series with the receiver until the noise ceases to be heard, calling the number of miles of cable inserted the measure of the noise, or we may compare the line noise with an adjustable standard of noise on which a reading can be taken when the two sounds are in the judgment of the observer equal in intensity.

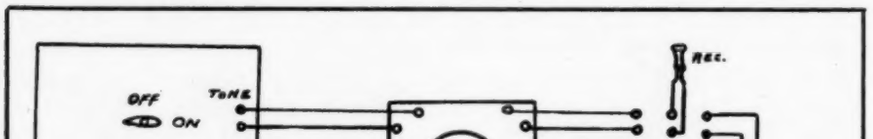



Fig. 3. Arrangement of Apparatus and Connections for Making Noise Tests.

The difficulty with the artificial cable method is that since ears differ in acuteness, no two observers will get the same answer. The better method is, therefore, to use a standard source of noise across the terminals of which are connected a receiver and a variable shunt for adjusting the noise heard in the receiver to equality with the noise in the same receiver when connected to the line.

A satisfactory type of portable noise standard consists essentially of dry cells operating a carefully adjusted vibrator having two windings, the primary winding being connected to the battery, and the secondary winding to the telephone receiver and shunt.

The arrangement of apparatus and connections for making noise tests are shown in Fig. 3. A double-pole, double-throw switch will suffice to connect the receiver, first to the line under test, and then to the shunt, in order that comparisons may be made. A 100,000-ohm lavite resistance is usually required in series with the receiver, when measuring induction to ground, in order to obtain a reading within the scale of the variable shunt.

A type of rheostat frequently used as a shunt consists of a box containing a set of resistances connected to contact terminals, and so arranged that when a wiper stands over a given contact, the reading corresponding with that contact will represent numerically that fraction of the total current flowing through the rheostat which passes through the telephone receiver. The unit for the measurement of noise then will be the sound in the telephone receiver when a given fraction of the output of the portable noise standard passes through the telephone receiver.

For comparative readings to determine the condition of balance of a single telephone circuit, any buzzer which will maintain a fairly constant output for a few hours, and a rheostat with a range from zero to about 5,000 ohms will serve the purpose, although the readings thus obtained cannot be compared with readings obtained on other lines by the use of other apparatus. The balance of the telephone circuit is usually satisfactory if the ratio of noise between wires to noise to ground is less than unity. It may run as low as 0.5 for short sections of line.

Before making tests, the telephone circuits should be disconnected from all terminal apparatus, and if it appears that the noise caused by the power circuits under investigation is masked by noise arising from sections of the line outside the parallel, the portion, including the parallel, should be isolated by opening all the circuits of the telephone lead at the proper points.

The noise tests which it is desirable to make on telephone circuits suspected of inductive interference, and the conclusions to be deduced from the results are:

1. Noise between wires:

Line open at the distant end; line shorted at the distant end; line looped through resistance of 1,000 ohms.

Noise between wires and ground:

Line open at distant end; line grounded at distant end.

2. When practicable these tests should be made with:

(a) Power line shut down;

(b) Power line energized without load; or

(c) Power line in operation with normal load.

If more than one power line is involved, measure the noise with but one line at a time energized and with all of the circuits energized.

From the foregoing measurements we learn: First, whether the telephone circuit is reasonably well-balanced; second, the amount of noise caused by each power circuit; third, what part of the noise is due to the voltages and what part to the currents of the interfering system, interference from voltages being indicated by high noise readings with the telephone line open and interference from currents by high readings with the telephone line short-circuited at the distant end; and fourth, from the measurements under different load conditions, an indication of what particular machines or conditions of the power circuit are responsible for the trouble.

### Co-ordinated Transposition.

For the simplest exposures to induction, when both power and telephone circuits are metallic, the balance of the telephone circuit is good and the parallel is fairly uniform throughout its length, permitting the two circuits to be accurately balanced with respect to each other by means of transposition, the foregoing noise measurements, together with maps showing the location of telephone and power poles and the arrangements of conductors, will provide all the data necessary for the design of a co-ordinated system of transpositions adequate to bring inductive interference within allowable limits.

By a co-ordinated transposition scheme is meant an arrangement of transpositions both in the telephone and power circuits

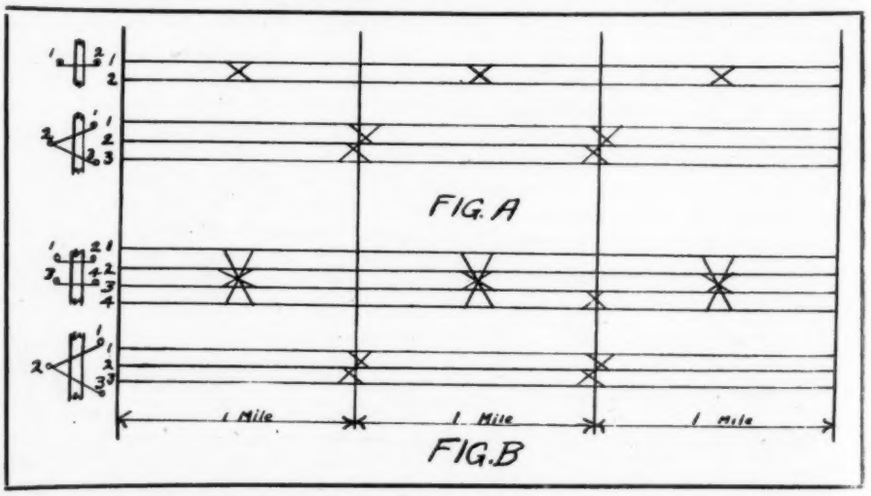



Fig. 4. Power and Telephone Circuit So Transposed as to Be Mutually Balanced—Co-ordinated Transposition Scheme for Telephone Circuit and Power Line.

which will minimize the transfer to energy inductively between the two circuits. The circuits so transposed are said to be balanced with respect to each other.

It will not be possible to give here the methods of design of transpositions for parallel power and telephone circuits. This subject has been treated in considerable detail by Harold S. Osborne in a paper presented at the annual convention of the A. I. E. E. on June 27, 1918.

Co-ordinated power and telephone transpositions are, in general, the most economical and effective method of reducing inductive interference where metallic circuits are involved. The importance of this method of treatment will justify a few words in regard to the theory and its application to the simplest cases.

Fig. 4-A shows, diagrammatically, a three-phase power circuit and a single telephone circuit transposed in such a way as to be mutually balanced. Each rotation of the power wires shifts the phase of telephone induction 120 degrees so that in three sections of equal length, including two such rotations, the sum of inductive effects of the three sections will be zero. This applies, however, to the balanced portions of the power circuit voltages and currents only—that is, to the portions which in the three wires add up Vectorally to zero.

The unbalanced or residual voltage and current, which is of considerable magnitude in most commercial, three-phase power lines, flows through the three line wires in parallel, returning via the earth. In order to balance out the inductive effects of these residuals, the telephone line is transposed at the mid-point of each untransposed section of the power line.

As the number of telephone circuits carried on the same pole line is increased, the design of transpositions becomes more difficult, since it is necessary to obtain a cross-talk balance between telephone circuits in addition to a balance of each telephone circuit to outside induction. Fig. 4-B indicates a co-ordinated transposition system involving a telephone phantom group, or two side circuits and a phantom circuit, and a three-phase power line. In order to check the efficacy of the transposition system in producing a balance, both to power induction and cross talk, it is necessary to determine for each circuit the total length exposed to induction of a given phase, at a given separation, and the total length which will carry induction of the opposite phase at the same separation, the difference between these lengths being the equivalent unbalanced exposure of the circuit in question.

It should be observed in Fig. 4, that those components of the power voltage, or current which flow along the three wires in parallel, will induce a voltage between the two sides of the telephone circuit in parallel and ground. This is known technically as longitudinal induction from residual voltages and currents.

No transposition scheme has any effect in reducing this component of induction. Where it becomes troublesome, we must turn to the design of the power circuit for a clew to its cause and the best method of treatment. (*To be concluded.*)

## Plans for Unifying Indianapolis Telephone Systems.

Physical consolidation of the telephone systems of the Indianapolis Telephone Co. and the Indiana Bell Telephone Co. will be effected in 1921 in three steps, the first to be taken this month. After the unification is completed it will be possible to talk from any automatic telephone to any Bell telephone or vice versa, according to Frank Wampler, vice-president and general manager of the Indiana Bell company.

The plans now provide that as the manual offices become obsolete or worn out, new machine switching offices will be put in, and Indianapolis eventually will have a full automatic or machine switching system. The unification of the two systems was made possible by the purchase some time ago of the Indianapolis Telephone Co. by the Indiana Bell Telephone Co.

"At the time of the purchase," said Mr. Wampler, "the Bell company had more than 62,000 telephones in Indianapolis and the Indianapolis company had nearly 12,000. In order to combine these two systems it has been necessary to make plans looking to the future of the telephone service which Indianapolis is to receive, and the first question to demand thorough consideration pertained to the kind of service to be provided. It is now decided that both systems will be retained in service.

"The additional facilities and special equipment necessary to effect the merger is costing about $1,000,000. Both systems are in good condition and the plans devised by the engineers provide for the utilization of both plants. In general the plans for the future are to retain all of the present manual or Bell offices as long as they are usable from a practical and economical standpoint."

## E. H. GARY OPTIMISTIC.

**Elbert H. Gary, head of the United States Steel Corporation, writing of the business outlook, says:**

**"While I recognize, and for many months have comprehended, dangers in the general situation, I am more optimistic in regard to the future of this country than I have been at any time during the last six years. If people generally will recognize the possible dangers and will, each for himself or herself, do everything possible and practicable to improve conditions, we shall soon return to a basis of living which should be entirely satisfactory."**

**Mr. Gary is of the opinion that "we may look forward with confidence to a marked improvement in business results, perhaps not so soon or so rapid as we could wish, but as certain and satisfactory as the disposition and the action of the majority of the people themselves will permit."**

## Women's Minimum Wage Made $12 in Minnesota.

The Minnesota Minimum Wage Commission recently increased the minimum wage for women and minors in cities of 5,000 or more from $11 to $12 per week. No action was taken by the commission on wages of women and minors employed in cities and towns of less than 5,000 population. The announcement of the increase of wage followed a secret session of the commission which was held in the Capitol building.

The new wage, which goes into effect about January 1, will give apprentices, who are 18 years or over, $9 for the first three months and $12 after six months. Apprentices under 18 years of age will receive $8 for the first three months; $9 for the second three; $10.50 for the third three; and $12 after nine months of service.

The commission, according to John P. Gardiner, commissioner of labor, will consider the minimum wage in cities of under 5,000 in about 60 days. It is expected the cost of living will materially decrease in that time and in all probability, it is stated, an increase in those cities will not be necessary. If living costs remain on a level with today's costs, it is probable an increase in wages will be granted women and minors in cities under 5,000 in the state.

## Dates for Kansas Convention Changed to February 1-3.

The Kansas Independent Telephone Association will hold its next annual convention at Salina, Kans., on February 1, 2 and 3, instead of at Topeka on February 9, 10 and 11, as previously announced. At a recent meeting of the executive committee it was decided to reconsider the action taken at Jefferson City, Mo.

The Lamar Hotel has been selected as headquarters for the convention and the Chamber of Commerce of Salina has assured the telephone men of Kansas and neighboring states a splendid reception.

A new departure is being contemplated in the way of a program and further announcement will be made later.

# The Problem of Telephone Service

## Duty of Utility to Keep Commission and Public Informed as to Limits of Accomplishment Commensurate With Available Revenue—Reducing "Service" to Tangible Definition—Paper Presented at Illinois Convention

By H. D. Currier

The word "service" as used in connection with a public utility may mean anything. In the mind of the subscriber, or user of the service, it may mean one thing, and as reflected from the endeavor of the public utility company it may mean another.

The subscriber, or user of the service, does not offer his definition of service in any other way than the reflection of satisfaction or dissatisfaction.

The public utility company may indicate its understanding of service in many ways. If the public utility company is guided by the conclusions of one man, the service rendered may not be sufficient to satisfy the minds of the subscriber or user. If a number of men are involved in formulating the service rendered, it may come nearer the point of satisfaction of the subscriber or user.

Where technical knowledge is properly co-ordinated with good business management, the service is usually good. Where the service is rendered with a full understanding of the public's requirements, combined with proper business and technical knowledge, the service is still better.

**Keep the Public Informed.**

This brings up the question: What are the public's requirements? We know the public is likely to require anything, if it is not properly educated as to the limits of accomplishments. It, therefore, seems necessary that the public utility company keep the public informed as to the limits of accomplishment possible, commensurate with available revenue.

The technical branch of a public utility company should keep the business part of the organization informed as to what these limits are, and it, in turn, should inform the public what rates are necessary, in order to render the best possible service, and the public should pay these rates.

In order to do all these things, and see that the public utility company and the public fulfill their obligations, we have caused to be organized the public utility commissions in the various states.

We have said it is the duty of the public utility company to keep the public informed as to the limits of accomplishment commensurate with available revenue. If this is true, it is the duty of the people in the public utility business to keep commissions advised as to what accomplishments are available for the public, providing the rates are forthcoming to render these accomplishments.

In our work of rendering service in the telephone business, we have covered a great deal of ground in a comparatively short time. The art of telephony is highly complicated—at least we have made it so. Commissions have not received from us the help to which they are entitled. When called upon to supply them with knowledge of the business we are in, we give them an answer embellished with involved data and so-called scientific facts, which are of slight value to them in arriving at conclusions.

The results of all this is that our rates are largely determined on the basis of physical valuation, and we occupy a position in relation to the public the same as the coal merchant or any other dealer in staple articles.

The service we render in the telephone industry is unlike any other public utility.

H. D. Currier, Chief Engineer, Kellogg Switchboard & Supply Co.

In our business we have not had a yardstick by which our endeavor was measured. Electric power has the unit of watts; gas can be measured in feet; transportation is reduced to the cost per car mile. The telephone has developed in its use so that it is part of our very selves.

The first conception of what a telephone was supposed to accomplish was that it permitted two people to talk to each other from a distance. If it fulfilled that purpose in the early days, the public was satisfied. Today, that accomplishment is taken for granted and service complaints are mostly founded on the delay in establishing connections, reliability of connections, failure to ring the called party, inability to initiate a second call and, in some cases, lack of courteous treatment.

**Temperament of Telephone User.**

The temperament of the user of a telephone is involved in rendering service. What other public utility can you find in which human temperament plays such an important part? Our commissions cannot deal with this question of temperament by handing the public a lot of technical data. They cannot soothe the passions of an irate subscriber by handing him a long tabulation on physical valuation.

They can, however, deal with this element of human temperament, if they have a code of accomplishments at their disposal to refer to and determine whether the conditions involving the rendering of service are in accord with the fundamentals of good practice.

We have spent years in this industry arguing among ourselves regarding our individual conception as to system of operating. The long-haired and wild-eyed inventors have preached their wares. The business man has not had time nor inclination to go into the details of design. He has worn himself out trying to deal with the public, using the tools the engineer has placed at his disposal. The commissions have tried to find some line of logic which would apply to the temperament of the subscriber, the business conception of the management and engineering data.

None of these perspections, taken alone, can guide commissions in arriving at the answer of rates and service.

What we need in our business is a lot of expert subscribers. By that I mean we should step out of our positions as expert telephone men, and, with our knowledge of the art, assume for the time the attitude of a subscriber. We have all done this at times. We all use telephones and pay for them. Our temperament has been reflected in the experiences we have gone through when things did not go right. We have formed our opinions of how good or how bad telephone service was. We have never gotten together as subscribers but always as expert telephone men.

The subscriber supports the industry. If all our subscribers knew what was possible or impossible in this business, we would be told what to render in accomplishment through our commissions. If

our subscribers knew what is in the storehouse of telephony, the arguments as to specific means of accomplishment would end and our commissions would judge service on a basis of the rendition of these accomplishments at the lowest annual charge per station.

Service as reflected in the mind of the subscriber is largely controlled by the central office equipment. The temperament of the subscriber is affected by the performance of the variable elements of the plant. Poles, wire, conduit, cable, etc., are what might be termed fixed elements. The variable happening in the central office must meet the variable temperament of the subscriber. Proper design of central office equipment should meet the impatient temperament of the subscriber.

Satisfaction should be conveyed to the subscriber, not by inviting him to come to our telephone exchange, and showing him the "wonderful complex" equipment which he does not understand, but the performance of our equipment should render an effect upon our subscriber, let him call it what he will, which will make it unnecessary for us to overawe him with our display.

**Requirements of the Public.**

If we become expert subscribers, what can we say we are entitled to in the way of accomplishment?

A service committee in Wisconsin has said the following: A subscriber is entitled to: 1. Fast answer; 2. Reliable connection; 3. Notification that the call is being taken care of; 4. Good transmission; 5. Prompt disconnect after conversation is completed; 6. Non-interference in communication; and 7. Courteous treatment.

What definitions of accomplishment have we available in the art of telephony which will meet these requirements?

Under the heading of a "fast answer," we can say that the application of the known principle of "call distribution" will produce this result. We could eliminate call distribution and substitute "operator distribution" and produce the same result.

Whether we use "call distribution" or "operator distribution" should not be made the subject of a technical argument but should be determined firstly on the basis as to whether a subscriber is entitled to a fast answer, and then the commission should order it done on a basis of lowest annual charges per station.

A reliable connection is a condition largely concerned with proper supervision and maintenance. This requirement has always been met by operating companies by the proper maintenance of equipment regardless of design.

Notification that the call is being taken care of has been met by introduction of revertive ringing tone and forms part of every up-to-date installation regardless of design. The revertive ringing tone in combination with machine-ringing produces satisfaction to the calling subscriber, in that he knows the called party is being rung, and the called party is caused to answer sooner.

Good transmission is the first requirement our subscribers demanded, and I think it is the present-day endeavor of most companies to give good transmission.

**The Secret of Eternal Youth.**

**There is no nobility but the nobility of achievement. Ponce de Leon need never have left home to find the secret of eternal youth. Every man has that secret in his own shop or office if his heart is in his job—and the name of this secret is work.**—Bruce Barton.

If good transmission is not rendered, we know it can and should be accomplished.

Prompt disconnect after conversation is completed can be given by the use of modern apparatus. A subscriber should not be dependent upon the inclination of an operator to disconnect his line in a common battery exchange. This accomplishment should be performed in the functioning of the equipment.

Non-interference in communication is, of course, an obvious requirement of good service and can be given by the introduction of secret service design.

Courteous treatment is not only to be expected in the telephone business but in all walks of life.

Considering the foregoing things a subscriber has a right to expect, and translating these demands into a definitial code, we can say if a central office equipment, regardless of its specific design, rendered the following accomplishments, the subscriber would receive what he has a right to expect: 1. Distribution of calls, traffic and load; 2. Instantaneous listening; 3. Machine ringing; 4. Revertive ringing tone; 5. Instantaneous disconnect; 6. Instantaneous recall; 7. Ringing control; 8. Dark keyshelf for manual boards; 9. Automatic peg count; and 10. Secret service.

The expert subscriber would want to know whether he is being served with the foregoing accomplishments.

The commissions are entitled to know how these things can be done—can they be rendered by rehabilitation methods? To do these things, are we going to involve conditions of financial hardship on the operating companies and the public?

These things can be accomplished by rehabilitation methods and, when applied, it has been the experience of the writer that the economies effected in all cases permitted of a sufficient saving in operating costs to pay the interest on the required investment and provide a sinking fund.

At this point it might be well to draw attention to the fact that the public should be made to pay rates to support good telephone service. The commissions should determine rates not only on a physical valuation, but should exercise the prerogative of their office to reward merit. It is hoped the ritual of accomplishment we are discussing may stimulate our commissions to take into account the elements of service in fixing rates.

It is hoped the consideration of service and the inclination of the public utility company to render service will cause commissions to grant rates which will let them live.

**Reduce Service to Tangible Definition.**

Telephone companies should not be penalized for being in business, and this is what results when rates for service are based upon physical valuation. We should sell our wares to the public through our commissions. The only thing we are selling is service, but if we cannot reduce the word "service" to a tangible definition and understandable language, we cannot expect to collect on it.

The element of a plant which has most to do with the subscriber's temperament and his understanding of service, represents the smaller portion of the physical valuation of the plant.

A valuation can be shown in a set-up of data before a commission, the buildings can be modern and the outside plant in 100 per cent physical condition, yet the service rendered can be poor. A rate could be granted and the public protest on the payment of this rate. The outside plant could be in a poor condition, yet, if continuity of conductors was present and the telephone building was in a dilapidated state, the public would not protest the same rate, if service under the foregoing definitions was being rendered.

The telephone company with the 100 per cent outside plant and modern building can get the rate today, for the courts have held that they can collect on proven investment, but the company with the poor outside plant and buildings, yet with a pleased public, cannot get the rate which will enable it to place its property in a good physical condition.

This statement is not made in criticism of commissions. They are working with all the tools we have given them to use. If we get behind the word "service," tell our commissions what it means, give them a measure by which they can determine our worth, we may be able not only with them, but with our public, to so present our case that we can prosper and be rewarded for our endeavor.

The code of accomplishments outlined were written with the single-office common battery exchange in mind. The statement as to what our expert subscriber

# Muskegon's Dial Maintenance Costs $45.30 per Thousand

THROUGH the courtesy of Mr. A. B. Clark, operating manager of the United Home Telephone Company, with headquarters at Muskegon, Mich., it is possible to present a detailed account of the cost of maintaining the dials in that Company's Strowger Automatic Exchange for the year ending September 1, 1920. A study of these figures will be of interest to telephone men as being generally typical of the experience in Strowger exchanges.

The Muskegon exchange had been in operation four years when the period covered by the record begins, so that things had assumed the normal average of routine operation. In September, 1919, 4152 dials were in service and a year later there were 4660, or an average for the 12 months of 4394.

During the year 417 cases of dial trouble of all sorts developed, being 9.5 per cent of the dials in service. This means that on an average each dial will require attention once during 10.5 years. In July 1.51 cases of dial trouble developed per day. This was the high month, and in April, the low month, 0.43 cases were reported per day. The average daily dial trouble for the year was 1.14, or one per day per 3834 dials in service.

The material used in repairing these 417 dials amounted to $51.86, or 12.5 cents per dial repaired. The average annual repair material cost was 1.18 cents per dial in service.

The labor cost of dial maintenance was $147.22, or 35.3 cents per dial handled. Of this amount $82.58 covers the cost of replacing dials, and $64.64 the labor of repairing. (Note: In Muskegon the regular outside maintenance man is sent out on dial trouble cases, but does no repairing. Instead, he removes the affected dial and brings it in to the shop where all repairs are made. This has been found more economical than doing the work on the job, and is much less trouble. Since all dials are interchangeable and easily mounted, it takes but a moment to make the change).

This gives a total cost of 47.8 cents per case of dial trouble, or 4.53 cents per dial in service per year. The total twelve-month maintenance cost for the 4394 dials in service at Muskegon, for both labor and material, was $199.08, or at the rate of **$45.30 per thousand dials per year.**


# AUTOMATIC ELECTRIC COMPANY

**FACTORY AND GENERAL OFFICES, CHICAGO, ILL.**

**BRANCH OFFICES:**

| | | | |
|---|---|---|---|
| New York City<br>21 East 40th St. | Philadelphia<br>The Bourse Bldg. | Boston<br>445 Tremont Bldg. | Detroit<br>525 Ford Bldg. |
| Cleveland<br>415 Cuyahoga Bldg. | Columbus<br>516 Ferris Bldg. | Rochester<br>519 Arlington Bldg. | Pittsburgh<br>2136 Oliver Bldg. |
| Ft. Worth<br>212 Lucern Bldg. | Ft. Wayne<br>502 Bass Bldg. | Kansas City<br>1001 New York Life Bldg. | |

**ASSOCIATED COMPANIES**

INTERNATIONAL TELEPHONE SALES AND ENGINEERING CORPORATION, New York
International Automatic Telephone Company, Ltd., London
Compagnie Francaise pour l'Exploitation des Procédés Thomson-Houston, Paris
Automatic Telephone Mfg. Co., Ltd., Liverpool. Automatic Telephones, Australasia, Ltd., Sydney.

would say he had a right to expect, is applicable to any exchange from the smallest rural plant to a multi-office district.

The time available does not permit going into detail as to how these various accomplishments can be rendered. The most economical and practical way of accomplishment should be the subject of discussion before the men employed in the technical branch of our business.

Conventions are mostly attended by managers—the business part of our industry. What you men are interested in, from the standpoint of service, is how can you sell it and make your business a success.

It is the job of the technical man to throw aside his scientific perspective and blend some business sense into his endeavor; instead of designing around a conceptive of mechanics and physics, he must go outside, out where the money comes from which pays his salary.

Do any of you realize that there is not a university in the world where a man can take a course in telephony and come out qualified to design a plant? Is it any wonder our business has been handicapped when we, ourselves, have not today a fixed code of accomplishments to which we should strive?

Today, we are in the formulation period of a mighty industry. Until we know what we are shooting at in the way of service, we will never produce the most economic and efficient design to render service.

The accomplishments outlined are not original with the writer. They are nothing but tabulations of things that the history of our business has disclosed as possible. The future may add to the list. So long as we design around that which has been disclosed as possible, we can safely say we are doing our part. The facts of our business as regards service have been referred to as follows:

"The conduct of people in relation to each other and the rule, called laws, governing these relations passed through several stages of development.

"There were various codes in use, and each code had some good in it. The man who attempted to master the reasoning of these various codes found them tucked away in musty files and legal recesses, until Blackstone went to work and filtered out a comprehensive reasoning basis for study.

"The telephone industry today is conducted by various codes of reasoning, and just as the various laws of the past were ultimately worked out by Blackstone, sooner or later the things governing telephone service have got to be Blackstonized."

We might add to this statement the fact that as the common laws of our country are founded upon the filtered reasoning of the people of the past, so will the future definition of telephone service be the filtered appreciation of our subscribers in a definitional form and not in the design form of the engineer.

The word "serve" is defined as follows: "Work for; aid; obey; suffice."

Applying these definitions to the business we are in, we can say the public utility company "works for" the public. We "aid" the public, for which we should be paid, in building the structure of social and civic relations of which we are all part. We should "obey" the fundamental laws of constructiveness, which have been written into our sciences and codes of equitable relations so that our endeavors may "suffice" to qualify us as having carried on our work, that it may rest in the knowledge of mankind in the form, and understanding it should have, to the other branches of human progress.

*And we must have a commission to see that we do a good job of giving service, and when we give service they should take it into account in making a rate.*

# Commissions, Courts and Councils

## Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchise, Rates and Service.

### Final Decision Issued in Chicago Telephone Rate Case.

New rate schedules which became effective in the city of Chicago and suburban territory of the Chicago Telephone Co. on January 1, 1920, will add approximately $1,948,600 to the company's revenues for its Chicago exchange properties and $550,000 in the suburban division.

The probable amount available for return on investment is estimated to be 7.9 per cent for Chicago and 5.9 per cent for the suburban exchanges. The fair value of the company's property in Chicago was found to be at least $70,000,000 as of July 31, 1919, and $15,792,508 for the property used and useful in furnishing telephone service in the suburban territory.

The new rate schedules for the Chicago Telephone Co. were approved by the Illinois Public Utilities Commission on December 20, 1920, after an exhaustive investigation extending over a period of many months, the company's rate application having been first filed on July 16, 1919. Certain temporary increases were allowed by the commission on July 31 of that year, pending final adjudication of the case.

Complaints were entered as to the quality of service furnished. However, the training of new operators under the advanced wage schedules is now progressing satisfactorily and current tests indicate a considerable improvement in service during the last few months.

The commission finds the present system of measuring service reasonably accurate and dismissed the complaint of C. W. Ward as to charges made for substation meters.

The value of the general services rendered by the American Telephone & Telegraph Co. to the Chicago Telephone Co. is not questioned by the commission but with reference to the license contract, it states as follows:

"Criticism as to the method of payment, insofar as it is dependent upon a percentage of the gross revenues might be sustained owing to the increase in the annual payment when gross revenues are, for any reason, increased."

"The particular amounts involved," it continues, "have been approved as items of operating expense in different jurisdictions by nine commissions within the last three years, however, and the commission after carefully considering all the evidence is of the opinion and finds that the present annual payment under the license contract, limited to $2.10 per station per annum for the city of Chicago and $1.91 per station per annum for the suburban territory, is not excessive and may be allowed as an item of operating expense."

Under the new rate schedule a guarantee of nine cents per day for 1.8 calls ($2.70 per month) will be required of subscribers to four-party nickel coin box service, who comprise 73 per cent of the company's patrons in the city of Chicago. All excess calls to be charged at the rate of five cents.

Individual measured business service is to cost $4 per month for 80 calls, excess calls up to 200 to cost four cents and calls over that number three and one-half cents.

Individual business coin box subscribers will be required to pay a minimum rate of $6, with an allowance of 120 calls, excess calls to cost five cents each. For two-party individual coin box service the guarantee is $4.50 per month for 90 calls, excess calls to cost five cents.

The rate for one-party measured residence service is $3.75 for 75 calls, calls from 76 to 200 to cost four cents and all calls over 200, three and one-half cents.

Two-party measured residence service carries a rate of $2.75 for 55 calls, calls from 56 to 200 to cost four cents and calls over 200 to cost three and one-half cents.

A guarantee of $3.75 per month for two-party residence coin box service is required, 75 calls being allowed. All excess calls are to be charged at the rate of five cents.

In the suburban district increases ranging from 25 cents to $2.50 are allowed for the various classes of business and residence service.

A connection charge of $3.50 is approved for individual and party line service and for extensions connected with any class of service. A charge of $3 is to be made for a change in the type or style of telephone set, or for moving an instrument from one location to another on the same premises. Other changes for moving equipment are to be based upon the cost of labor and material.

The Chicago Telephone Co. is ordered to discontinue the publication of three issues of its directory per annum and to make publication of but two issues during the calendar year. This, it is estimated, will effect an annual saving of $200,000.

All of the commissioners concur in the decision but Commissioner W. A. Shaw does not subscribe to all the arguments and reasons given in arriving at the result stated.

It is understood that the new schedule will be fought in an appeal by the city of Chicago to the Sangamon County Circuit Court at Springfield.

The rate for four-party coin box residence service in particular is being protested. Relative to this rate Special Assistant Corporation Counsel Chester E. Cleveland has made the following statement:

"We think the order is very unjust to the people. As an illustration, take the four-party lines. The commission has acted on the theory that no one ought to be permitted to have a telephone unless he averages at least two outgoing calls a day. This is in the interest of the telephone company and against the interest of the people."

## Higher Rates and Miscellaneous Move Charges Allowed.

The Florida Railroad Commission issued an order recently authorizing the South Atlantic Telephone & Telegraph Co., of Miami Beach, to increase its rates for telephone service to the following schedule recently:

Rates Inside Exchange Base Rate Area.

| Unlimited Service | Rate Per Month | Joint User Rate |
|---|---|---|
| Business one-party | $5.50 | $1.50 |
| Business four-party | 3.50* | 1.50 |
| Business one-party inward | 3.00 | |
| Business extension | 1.00 | |
| Residence one-party | 3.25 | .75 |
| Residence two-party | 2.75 | .75 |
| Residence 4-party | 2.25* | .75 |
| Residence extension | 1.00 | |

Measured Service

| | Rate Per Month | Messages Per Month | Additional Messages Each |
|---|---|---|---|
| Business one-party message rate | $4.00 | 100 | 3½c |
| Joint user | 1.00 | | |
| Extension | 1.00 | | |

*Four party service is available only outside base rate area.

Desk equipment 25 cents additional.

Rates Outside Exchange Base Rate Area.

Additional rate for extra distance beyond exchange base rate area, 42 cents per month per one-fourth mile or fraction thereof. This charge to be prorated between two-party and four-party stations.

## Eldorado (Ill.) Telephone Co. Secures Rate Increase.

The Eldorado Telephone Co., of Eldorado, furnishing service to 709 stations, was authorized by the Illinois Public Utilities Commission recently to place in effect the following schedule of rates:

| | Rates per Annum. Old. | New. |
|---|---|---|
| Individual line business | $24.00 | $27.00 |
| Two-party line business | 18.00 | 24.00 |
| Four-party line business | 15.00 | 18.00 |
| Business extensions | 6.00 | 12.00 |
| Individual line residence | 15.00 | 18.00 |
| Two-party line residence | 12.00 | 15.00 |
| Four-party line residence | 10.80 | 12.00 |
| Residence extension | 6.00 | 6.00 |
| Rural party line business | 7.20 | 18.00 |
| Rural six-party line residence | 9.60 | 12.00 |
| Rural eight-party line residence | 8.40 | 12.00 |
| Rural ten-party line residence | 7.20 | 12.00 |

The commission ordered that the company set aside $100 monthly, plus 6 per cent per annum of the cost of all new additions, to provide for a depreciation reserve.

## Higher Rates Pending Investigation by Commission.

In a ruling handed down recently by the Illinois Public Utilities Commission, the Central Telephone & Telegraph Co. is authorized to increase its monthly rates in Paxton as follows:

| | Old. | New. |
|---|---|---|
| Individual, business | $2.00 | $3.25 |
| Individual, residence, desk set | 1.50 | 2.50 |
| Individual, residence, wall set | 1.50 | 2.25 |
| Two-party, residence, desk set | 1.25 | 2.25 |
| Two-party, residence, wall set | 1.25 | 2.00 |
| Rural party line | 1.50 | 1.75 |
| Rural switching stations | .75 | 1.00 |
| Extension sets, desk | .... | .75 |
| Extension sets, wall | .... | .50 |
| Extension bells | .... | .25 |

Subject to a discount of 25 cents per month per station, if bills are paid on or before the 15th of the month in which the service is rendered.

If, upon further investigation, the commission finds that the foregoing schedule of rates is excessive in any particular, the company is required to refund any such excess with interest at 5 per cent per annum to all subscribers paying bills under said schedules.

## Provisional Rates Approved Pending Investigation.

In a provisional order handed down recently by the Illinois Public Utilities Commission, the Dixon Home Telephone Co. is granted permission to increase its rates in Dixon and vicinity. If, upon further investigation, the new rates are found to be excessive in any particular, the Dixon Home Telephone Co. is required to refund any such excess with interest at 6 per cent to patrons paying bills under the new schedule. Here are the old and new rates:

| | Rates per Annum Old | New |
|---|---|---|
| Individual line business | $36* | $51* |
| Two-party line business | 30* | 45* |
| Extensions business | 6 | 12 |
| Individual line residence | 24* | 33* |
| Two-party line residence | 21* | 27* |
| Four-party line residence | 18* | 24* |
| Extensions residence | 6 | 6 |
| Rural residence | 21** | 24** |

*A discount of 25 cents per month applies, if payment is made on or before the 15th day of the current month.

**A discount of 75 cents per quarter applies if payment is made on or before the 15th day of the second month of the current quarter.

## Higher Rates Contingent Upon Improvement in Service.

Contingent upon an improvement in its service within 30 days, the Pike County Telephone Co., of Barry, Ill., was authorized by the state public utilities commission, in a ruling handed down November 29, to charge the following rates for telephone service:

| | Rates per Annum | |
|---|---|---|
| Individual line, business | $21 | $27 |
| Two-party line, business | 21 | 21 |
| Individual line, residence | 15 | 21 |
| Two-party line, residence | 15 | .. |
| Three-party line, residence | 15 | .. |
| Four-party line, residence | .. | 18 |
| Multi-party rural | 15 | 18 |
| Service stations | 3 | 6 |

A discount of 25 cents per month applies to the rates for business and residence telephones, exclusive of extension telephones, if payment is made monthly at the office of the company on or before the 15th day of the current month.

If, upon further investigation by the commission, the foregoing rates are found to be excessive, the Pike County Telephone Co. is ordered to make refund of any such excess to subscribers, plus interest at 6 per cent per annum.

## Asks Injunction to Prevent Paralleling Power Line.

The Haverhill Co-operative Telephone Co., on December 1, appealed to the Kansas Court of Industrial Relations for an order prohibiting suspension of a high

power transmission line near its wires. The power line is being built by the Empire Gas & Fuel Co.

The power line and telephone wires run parallel for a distance of six miles. Owners of the telephone system declare operation of the power line will destroy their business.

## Small Minnesota Telephone Company Raises Rates.

Permission to increase its local and rural monthly rates and place in effect service connection and miscellaneous charges was granted the Browerville Telephone Co., of Browerville, Minn., by the state railroad and warehouse commission in an order issued November 24. The old and new rates and the service connection charges authorized are:

| | New. | Old. |
|---|---|---|
| Individual line business | $2.25 | $2.50 |
| Two-party line business | .... | 2.25 |
| Individual line residence | 1.25 | 1.75 |
| Two-party line residence | .... | 1.50 |
| Extension stations, business or residence (net) | .... | .50 |
| Rural switching charge (net) | .25 | .35 |
| Extension bells (net) | .... | .25 |

All rates are to be billed gross except where quoted net.

A discount of 25 cents per month is allowed on all local gross rates if paid on or before the 15th day of the month in which the service is rendered. Rural switching charges payable annually in advance.

| | Business Stations | Residence Stations | Extension Stations |
|---|---|---|---|
| Instrument not in place | $2.00 | $1.50 | $1.00 |
| Instrument in place | 1.50 | 1.00 | No charge |

Move charges and charges for changes in directory listings are the same as those allowed other Minnesota companies with like connection charges.

The Browerville Telephone Co., a corporation, operates approximately 107 town and performs switching service for 320 rural connecting line stations.

## Rates Increased—Proper Accounting Ordered.

The Minnesota Railroad & Warehouse Commission, in granting an increase in telephone rates to the Garfield Farmers & Merchants Telephone Co., which operates in Garfield, Brandon and Evansville, orders that the records and accounts of the company be kept in accordance with the uniform system of accounts prescribed by the commission. The company's rates are increased from $1.25 per month for all classes of service to the following schedule:

| | |
|---|---|
| Individual line business | $2.25 |
| Individual line residence | 1.50 |
| Rural multi-party, metallic circuit | 1.50 |
| Rural multi-party, grounded circuit | 1.25 |

The Garfield Farmers & Merchants Telephone Co. operates approximately 39 town and 215 rural stations at Garfield, 61 town and 208 rural stations at Brandon, and 67 town and 197 rural stations at Evansville.

## Higher Rates Allowed Minnesota Mutual Company.

On November 30, the Minnesota Railroad & Warehouse Commission entered an order which authorized the Farmers Mutual Telephone Co. to increase its rural telephone rates and establish service connection and other miscellaneous charges at Cerro Gordo. Heretofore, the company has been charging $8 per year for rural service and $1 per month for rural schools. The rates authorized and the service connection charges follow:

| | |
|---|---|
| Rural multi-party, metallic circuit | $1.75 |
| Rural multi-party, grounded circuit | 1.50 |
| Rural schools | 1.25 |

Rural rates are payable quarterly, with discounts of 75 cents, 50 cents, and 25 cents, if paid on or before the 20th day of the first, second or third month of the quarter in which the service is rendered.

SERVICE CONNECTION CHARGES.

| | Business Stations | Residence Stations | Extension Stations |
|---|---|---|---|
| Instrument not in place | $2.00 | $1.50 | $1.00 |
| Instrument in place | 1.50 | 1.00 | No charge |

The Farmers Mutual company operates rural lines covering about nine townships, and serves approximately 292 rural stations.

## Tri-County (Mo.) Telephone Co. Increase Rates Temporarily.

Having received a letter from the mayor of Nelson, Mo., and a number of prominent business subscribers, endorsing an increase in rates for the Tri-County Telephone Co., the state public service commission authorized the company recently to increase its rates temporarily. Here are the old and new annual rates:

| | Old | New |
|---|---|---|
| Business, direct line | $18 | $30 |
| Business, extension | 6 | 12 |
| Residence, direct line | 18 | 21 |
| Desk sets, additional | | 3 |
| Rural— | | |
| Class A switching | 6 | 9 |
| Class B switching | 18 | 21 |
| Class C switching | 12 | 15 |

A charge of 25 cents per month is made where Class B subscribers do not pay during the month in which service is rendered.

The new rates are to remain in effect for a period of 13 months from December 1, 1920, at the end of which period, the rates in effect prior to December 1, 1920, are to be charged, unless otherwise ordered by the commission.

## Temporary Rate Increase in North Kansas City, Mo.

Authority to increase rates temporarily for a period of 13 months was granted the Liberty Telephone Co. by the Missouri Public Service Commission in a ruling handed down recently. The new schedule of rates applies only to service given subscribers of the company's North Kansas City exchange who have unlimited service to the exchange in Kansas City, and the increase allowed represents the increase in rates allowed by the commission, effective July 1, 1920, for the exchange at Kansas City. Here are the old and new annual rates:

| | Old. | New. |
|---|---|---|
| Business, individual line | $84 | $120 |
| Business, two-party line | 66 | 102 |
| Residence, individual line | 51 | 57 |
| Residence, two-party line | 36 | 42 |

## Increase in Rates Is Authorized at Ravenna, Neb.

The Ravenna Telephone Co., which went all through the war period without a raise in rates, has just been favored by the Nebraska State Railway Commission with permission to charge the following schedule of monthly rates:

| | |
|---|---|
| Business, individual, metallic | $3.00 |
| Business, two-party, metallic | 2.50 |
| Business, individual, grounded | 2.50 |
| Business, extensions | 1.00 |
| Residence, individual, metallic | 1.75 |
| Residence, two-party, metallic | 1.50 |
| Residence, individual, grounded | 1.50 |
| Residence, extension | .50 |
| Farm, metallic | 2.00 |
| Farm, grounded | 1.50 |
| Service station | .50 |

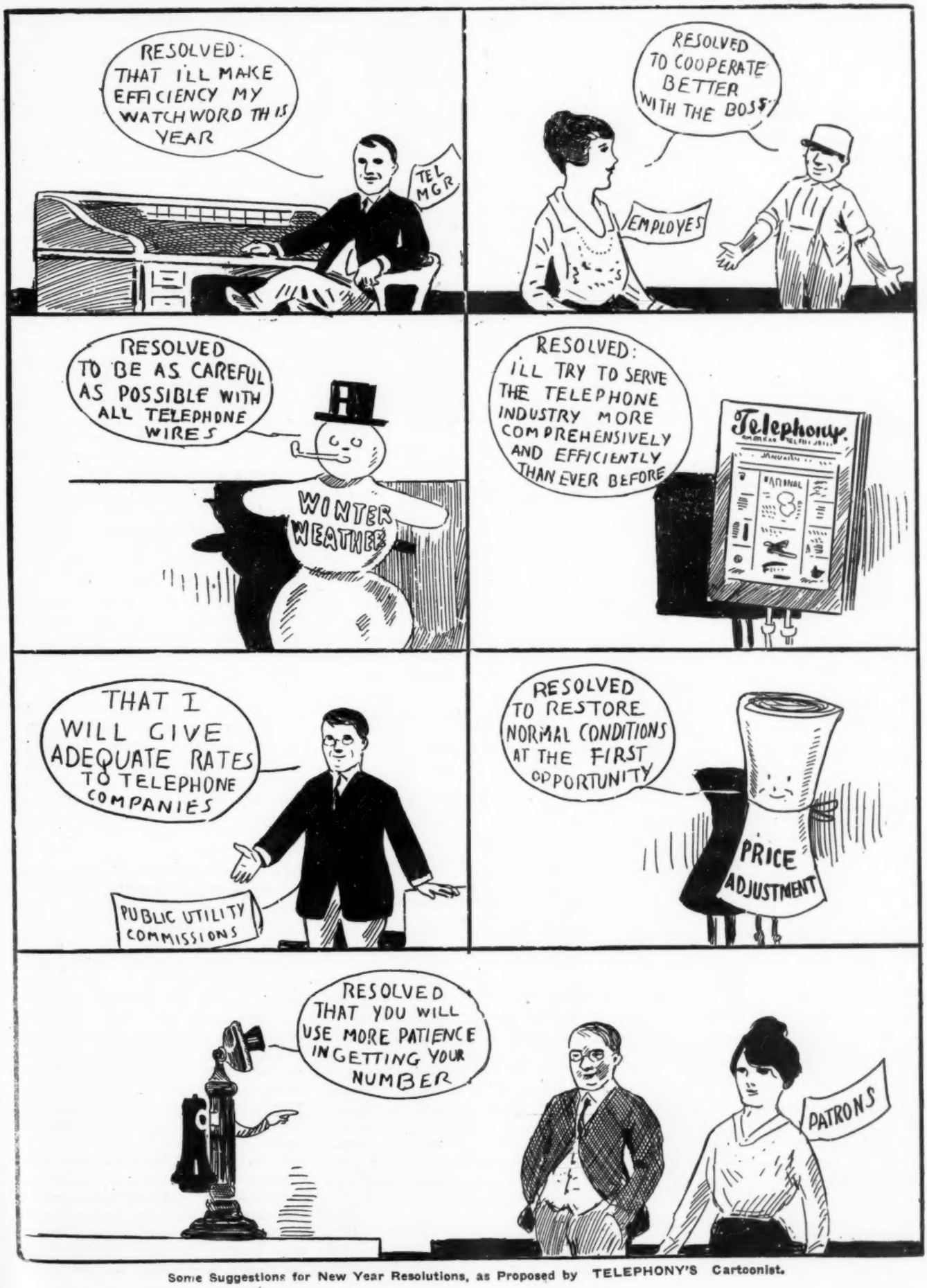
The company has a plant that cost $40,000, and from 1913 to 1918, paid dividends of 6 per cent. In 1919 it suffered a deficit of $258, and this year the deficit is $600. The new rates will add about $2,500 a year to the company's revenues. None of the 537 subscribers protested the increase.

## Higher Rates Are Secured After Much Difficulty.

The Arcadia (Neb.) Electric Light & Telephone Co., after much travail, has secured an increase in rates from the Nebraska State Railway Commission. The difficulty lay entirely with the company, says the commission. J. L. Wait, the owner, is an electric light man who bought the telephone property in 1915 from the Sherman County Telephone Co., paying $4,255 in cash and giving a $10,000 mortgage on it. At the present time he has a $3,000 equity in the property, and the commission, after vainly trying to get a financial showing from him and realizing that he needed help, sent its own accountant there.

The trouble lay in the fact that the accounts had been so intermingled that it was impossible to say whether the light rate or the telephone rate was inadequate. The showing was that the telephone company, which had had no increase since before the war, was not earning anything on the investment. Rates were $1 for residence and $1.50 for business service. The new monthly rates are:

| | |
|---|---|
| Business | $2.00 |
| Residence, individual | 1.25 |
| Residence, party | 1.15 |


RESOLVED: THAT I'LL MAKE EFFICIENCY MY WATCHWORD THIS YEAR
TEL MGR
RESOLVED TO COOPERATE BETTER WITH THE BOSS
EMPLOYES
RESOLVED TO BE AS CAREFUL AS POSSIBLE WITH ALL TELEPHONE WIRES
WINTER WEATHER
RESOLVED: I'LL TRY TO SERVE THE TELEPHONE INDUSTRY MORE COMPREHENSIVELY AND EFFICIENTLY THAN EVER BEFORE
Telephony
THAT I WILL GIVE ADEQUATE RATES TO TELEPHONE COMPANIES
PUBLIC UTILITY COMMISSIONS
RESOLVED TO RESTORE NORMAL CONDITIONS AT THE FIRST OPPORTUNITY
PRICE ADJUSTMENT
RESOLVED THAT YOU WILL USE MORE PATIENCE IN GETTING YOUR NUMBER
PATRONS

Some Suggestions for New Year Resolutions, as Proposed by TELEPHONY'S Cartoonist.

| | |
|---|---|
| Farm | 1.25 |
| Switching | 4.00* |
| Extensions, residence | .50 |
| Extensions, business | .75 |

*Per year.

| | |
|---|---|
| Joint user service, rate | 1½ |

## New York Company Files Tariff for Increased Rates.

The Subscribers' Service Telephone Co., formerly the Neversink River Telephone Co., under a tariff filed December 9 with the New York Public Service Commission, will establish the following annual rates for telephone service in Woodridge and hamlets in Fallsburgh and Neversink townships in Sullivan county:

| | |
|---|---|
| Individual line, business | $48 |
| Two-party line, business | 39 |
| Four-party line, business | 33 |
| Individual line, residence | 39 |
| Two-party line, residence | 33 |
| Four-party line, residence | 27 |
| Rural line, business | 39 |
| Rural line, residence | 27 |

## Depreciation Reserve and Proper Accounting Ordered.

In an order issued December 10 by the North Dakota Railroad Commission granting permission to the Brinsmade Telephone Co. to place in effect a new schedule of temporary rates, pending evaluation of its property by the commission, the company is ordered to immediately establish and maintain a system of accounts prescribed by the commission on March 5, 1916, for Class D companies. The only value on record is that used for taxation purposes in 1919, which is, $2,875. Here are the temporary rates:

| | |
|---|---|
| Business stations | $2.75 |
| Residence stations | 1.50 |
| Rural multi-party | 2.00 |
| Service stations | .40 |

The foregoing rates are net. Subscribers are to be billed at gross rates 25 cents higher than net rates, with a discount of 25 cents on all bills paid on or before the 15th day of the current month.

The company was also authorized to establish the following service connection charges:

| | Business. | Residence. |
|---|---|---|
| Instrument in place | $1.50 | $1.00 |
| Instrument not in place | 2.00 | 1.50 |
| Change in location of instrument within same room | | $1 |
| Change in location of instrument from one room to another on same premises | | 2 |
| Change in type of instrument | | 1 |

A total of 27 business, 26 residence, 59 rural multi-party, and 105 service stations are served by the Brinsmade Telephone Co., which operates a 100-drop magneto switchboard at Brinsmade, and two small 25-drop boards at Harlow and Baker.

Seven per cent per annum is to be set aside to provide for a depreciation reserve before any dividends are declared.

## Temporary Rates, Pending Evaluation of Property.

In granting an increase in rates to the Stanley Telephone Co., of Stanley, N. D., the state railroad commission on December 10 ordered that the company immediately establish the Class D accounting system prescribed by the commission on March 5, 1916. The company's rates are increased from $2.50 per month for business, $1.50 per month for residence and 5 cents per call for service stations to the following schedule, effective January 1:

| | Rates per Month |
|---|---|
| Business stations | $3.25 |
| Residence stations | 2.25 |
| Business extensions | 1.00 |
| Service stations | .50 |
| Desk sets, additional | .25 |

All bills are to be rendered promptly on the first of each month at gross rates 25 cents per month higher than the foregoing net rates. A discount of 25 cents is to be allowed when payment is made on or before the 15th of the current month.

The Stanley Telephone Co. began operations about 12 years ago and operates a common-return system. A total of 41 business, 49 residence and 140 service stations in the surrounding rural territory are served by the company.

The estimated cost of the plant, less depreciation was shown by the company to be $3,480. No depreciation reserve has been set aside, and while the proprietor devoted considerable time to the business, he received no compensation therefor in 1919. The commission made no evaluation of the plant, but used the foregoing figure as reasonable for establishing the foregoing rates, pending such evaluation.

Authority was granted the company to establish the following service connection charges at Stanley.

| | Business | Residence |
|---|---|---|
| Instrument in place | $1.50 | $1.00 |
| Instrument not in place | 2.00 | 1.50 |
| Moving an instrument within same room | | $1 |
| Moving an instrument from one room to another on same premises | | 2 |
| Changing type of instrument | | 1 |

## Denied Authority to Increase Rates—Proper Accounting.

Finding that the rates now charged by the Spencer Telephone Exchange, of Spencer, S. D., are sufficient to meet all reasonable requirements of the company, the South Dakota Railroad Commission, on December 8, denied the application of the company for authority to increase rates. The net monthly rates in effect since April 29, 1918, and which are to remain in effect are:

| | |
|---|---|
| Business stations | $2.00 |
| Residence stations | 1.10 |
| Rural party line (net) | 1.25 |

Estimating the operating expenses and revenues of the company on the basis of statements submitted by other companies of similar size and character, the commission finds that the old rates yield a return of approximately 11 per cent upon a fair value of $11,000, which, the commission claims, should be amply sufficient to meet all requirements of the company.

In its order the commission directed the company to immediately establish and maintain records that conform to the system outlined in the uniform system of accounts established by the commission.

The Spencer Telephone Exchange owns and operates an exchange at Spencer, together with eight rural lines connected therewith, and furnishes service to 130 exchange subscribers and 146 rural subscribers.

## Asks Injunction to Prevent City from Interfering with Rates.

Application to the federal court for the northern district of Texas to restrain the city of Alvord, Texas, from interfering with his increasing telephone rates in that town from $2.50 for business telephones and $1.50 for residence telephones to $4 and $2.50 was made before Judge James C. Wilson, December 4, by A. C. Hughes.

Judge Wilson directed the entering of an order to require the mayor and aldermen of Alvord to appear December 13 and show cause why the injunction should not be granted.

Mr. Hughes, in a petition filed with the court, said that the present rates do not allow him a reasonable return on his investment in the telephone plant and system and that the city has refused to allow him permission to raise the rates. It was alleged also that threats have been made by subscribers to refuse to pay higher rates and to seek to enjoin him if he attempts to put in a new schedule of higher rates.

## No Improvements in Plant, Rate Application Not Considered.

On December 6, the Wisconsin Railroad Commission issued an order dismissing the application of the Cuba City Telephone Co., of Cuba, to increase its rates, without prejudice to the right of the company to file such other application for authorization of a new schedule of rates as may appear proper and necessary when it shall have actually undertaken the rebuilding outlined in the decision of the commission dated September 26, 1919, and satisfies the commission that it is in a position to give an adequate grade of service.

In its decision, the commission says: "Inasmuch as the company is now, according to our audit, earning a very liberal return on its actual investment, and as there has apparently been no improvement made in the applicant's plant since the time of our former decision, it will

not be possible for the commission to give consideration to the present application.

"We stand ready, however, to authorize either the schedule set forth in our decision of September 26, 1919, or any other schedule of rates to fully protect any reasonable investment the company may make in rebuilding its plant to insure better service. The commission, however, cannot authorize any rate increase until this rebuilding has been undertaken in a businesslike manner. The applicant's request must, therefore, be denied."

## Higher Rates and Miscellaneous Charges Allowed.

The Wisconsin Railroad Commission on October 29 issued an order authorizing the LaCrosse Telephone Co. to increase its rates and establish miscellaneous move charges at LaCrosse and Onalaska as follows:

| | |
|---|---|
| One-party, business | $4.25 |
| Two-party, business | 3.75 |
| Four-party, business | 3.25 |
| P. B. X. trunks | 4.25 |
| One-party, residence | 2.75 |
| Two-party, residence | 2.25 |
| Four-party, residence, desk | 2.00 |
| Four-party, residence, wall | 1.75 |

Less 25 cents discount if paid by the 25th. (50 cents advance on business and 25 cents on residence.)

## Wisconsin Farmers' Company Increases Rural Switching Charge.

Permission was granted the Leeds Farmers Telephone Co. on November 30 by the Wisconsin Railroad Commission to increase its rate from its old rate of $13.60 per station per year to the following schedule:

Stations directly connected to Rio exchange, $4.50 gross, $3.75 net per quarter; stations directly connected to Columbus exchange, $5.25 gross, $4.50 net per quarter.

The new rates apply for service rendered to subscribers connected directly to the Peoples Telephone Co., at Rio, and to the Wisconsin Telephone Co.'s exchange at Columbus, and are effective for service rendered on and after December 1, 1920.

The company furnishes telephone service to approximately 310 rural subscribers in the southeastern part of Columbia county.

## Installation Without Setting of Poles Not Law Violation.

On December 7, the Wisconsin Railroad Commission dismissed the investigation, on its own motion, of the alleged violation by the Lyden Telephone Co. of chapter 610 of the laws of 1913. The case arose from an informal complaint made by the Footville Telephone Co. to the effect that the Lyden Telephone Co. had heretofore extended its lines for local service in the towns of Janesville, and Center, Rock county, thereby duplicating the lines of the Footville Telephone Co., which extension it was alleged, was made without authority and without complying with the provisions of chapter 610 of the laws of Wisconsin of 1913.

It appears from the commission's investigation that the Lyden Telephone Co. installed a telephone at the farm now occupied by Mr. Adee, in the year 1908, stringing its wires on the poles of the Wisconsin Telephone Co.'s Janesville-Oregon Junction toll line, maintaining a total of 875 contacts on these poles under a pin rental agreement with the Wisconsin Telephone Co. The Lyden company paid pin rental of the poles leading to the Adee farm continuously since 1908.

The telephone instrument in the Adee residence has been installed and removed a number of times since 1908, the last installation being made during the first part of the present year. This installation, however, did not require the setting of any poles and could not, in the opinion of the commission, be considered an extension within the meaning of chapter 610 of the laws of 1913.

## Higher Rates Granted Wisconsin Telephone Co.

The Wisconsin Railroad Commission issued orders on November 22 and 24, granting permission to the Wisconsin Telephone Co. to increase rates at a number of its exchanges. The monthly rates authorized at the different exchanges are as follows

| Effective for service within radius of one mile from central office. | Omro. West Bend. Wrightstown. | South Milwaukee. | De Pere. |
|---|---|---|---|
| One-party, business | $3.00 | $3.50 | $4.00 |
| Two-party, business | 2.50 | 3.00 | 3.50 |
| Extension, business | 1.00 | 1.00 | 1.00 |
| One-party, residence | 2.00 | 2.00 | 2.25 |
| Two-party, residence | 1.75 | 1.75 | 2.00 |
| Four-party, residence | 1.50 | 1.50 | 1.75 |
| Extension, residence | .75 | .75 | .75 |
| Rural multi-party | 2.00 | 2.00 | 2.00 |
| Switching service to roadway companies (per annum) | 7.50 | 7.50 | 7.50 |

| Effective for service within base rate area. | Racine. | Oshkosh. Appleton. Beloit. Fond du Lac | Kenosha. Green Bay. |
|---|---|---|---|
| One-party, business | $5.50 | $4.50 | $4.50 |
| Two-party, business | 4.50 | 3.50 | 3.50 |
| Extension, business | 1.00 | 1.00 | 1.00 |
| One-party, residence | 3.00 | 2.50 | 2.50 |
| Two-party, residence | 2.50 | 2.00 | 2.25 |
| Four-party, residence | 2.00 | 1.75 | 2.00 |
| Extension, residence | .75 | .75 | .75 |
| Rural service within 6 miles from central office | 2.25 | 2.25 | 2.25 |
| Switching service to roadway companies. | .75 | .75 | .75 |

With the exception of a few changes by the commission, the rates asked for were allowed.

## Rate Increase Authorized for Village of Blair, Wis.

On December 17, the Wisconsin Railroad Commission authorized the Preston Farmers Telephone Co. to increase its rates for telephone service, effective January 1, 1921, to $16 per year with a discount of $1 if the rental is paid on or before March 1. A charge of 10 cents for night calls was also authorized.

The company owns and operates a telephone system affording service to about 340 subscribers in the village of Blair, Trempealeau county, and in the rural territory tributary thereto. The exchange is located in rented quarters in Blair, and about 70 of the company's total number of subscribers reside in the village, receiving service over single and party lines. All the circuits, both rural and local are grounded, but on account of the prospective construction and extension of electric transmission lines, the telephone company will be obliged this coming year to reconstruct a large number of its circuits and make them metallic, in order to avoid inductive interference. The company's secretary estimates that this work will involve an expenditure of $7,000 or over.

The application of the new rate will yield an annual revenue of about $5,100. Upon this basis, the company will have about $1,100 available for interest and depreciation.

## Telephone Tolls Throughout Wisconsin May Be Reduced.

Possibility of a state-wide reduction in long distance telephone tolls, affecting all lines in Wisconsin, developed December 7, at a hearing before the state railroad commission on the Wisconsin Telephone Co.'s request for a survey of long distance conditions.

A sweeping survey will be made by the commission, it was announced, with a "view to ascertaining whether a general reduction in all toll charges is not possible."

Existing toll rates in Wisconsin are those fixed by the federal government during its period of war-time control of the telephone systems, and are about 25 per cent higher than those which prevailed prior to the time the lines were taken over in 1917.

## Program of Reconstruction Completed, Rates Increased.

The Wisconsin Railroad Commission, on December 9, authorized the McKinley Telephone Co. to increase its rates, effective January 1, 1921, from its old rate of $1.50 a month, subject to a discount of 25 cents if paid on or before the 15th of the month, to $1.75 a month, subject to a discount of 25 cents if paid on or before the 15th of the month.

A charge of 10 cents for a local call made by a non-subscriber was allowed.

According to its report of December 31, 1919, the McKinley company has 23 circuits connected to its switchboard serving 424 subscribers, all classified as rural.

## New Rates Authorized for Gleason, Wis., and Vicinity.

The Wisconsin Railroad Commission recently issued an order authorizing the Gleason Telephone Co. to increase its rates for telephone service from its old rate of $1.50 per telephone per month to the following schedule:

| | Gross |
|---|---|
| Business | $2.25 |
| Residence | 2.00 |
| Rural | 2.00 |

The new rates are subjected to the usual 25-cent per month discount for prompt payment of bills, and are effective for service rendered on and after December 1, 1920.

The company is operating in Gleason and the surrounding territory. The report of the company shows that 49 miles of wire, 40 feet of 60 pair cable, and 33 miles of poles are in operation, and that it owns all but the transmitter and receivers of the substation equipment for 93 subscribers.

## Summary of Commission Rulings and Schedule of Hearings.

ARKANSAS.

December 11: Application filed by the Prairie Grove Telephone Co., of Prairie Grove, for authority to increase rates, effective January 1.

CALIFORNIA.

December 17: Application filed by the Pacific Telephone & Telegraph Co. for authority to exercise the franchise privileges recently granted the company by the city of Merced. The cost of the franchise to the company is given as $150.

LOUISIANA.

December 15: Hearing at Baton Rouge on application of the Cumberland Telephone & Telegraph Co. for authority to increase rates throughout the state.

MINNESOTA.

January 11: Hearing at Le Roy on application of the Le Roy Telephone Co. for authority to increase its local and rural rates at Le Roy and Adams, and to establish a toll rate between these stations.

January 13: Hearing at Belgrade on application of the Commercial Telephone Co. for authority to increase rates and establish service connection and miscellaneous charges at Belgrade.

January 18: Hearing at Sleepy Eye on application of the Sleepy Eye Telephone Co. for authority to increase its local and rural rates and establish service connection and other miscellaneous charges at Sleepy Eye.

January 19: Hearing at Wabasso on application of the Redwood County Rural Telephone Co. for authority to increase local and rural rates and establish service connection and other miscellaneous charges at Redwood Falls, Morgan, Wabasso, Walnut Grove, Belview, Echo, Vesta, and Delhi; also for authority to amend present toll rate schedule between these towns.

January 20: Hearing at Redwood Falls on application of the Redwood County Rural Telephone Co. for authority to increase local and rural rates and establish service connection and other miscellaneous charges at Redwood Falls and vicinity; also for authority to amend present toll rate schedule.

MISSISSIPPI.

December 20: Hearing at Jackson on application of the Cumberland Telephone & Telegraph Co. for authority to increase rates.

MISSOURI.

December 18: The commission authorized the Kansas City Telephone Co. to charge certain rates for service in the Fairmount exchange area, upon the consolidation of the Southwestern Bell Telephone Co. and the Kansas City Home Telephone Co., operating in and about Kansas City, Independence, and Fairmount.

December 18: Supplemental orders issued authorizing the Southwestern Bell Telephone Co., and the Kinloch Telephone System to continue in effect present schedules of rates for a further period of 13 months, from January 1, 1921, to February 1, 1922, unless otherwise ordered by the commission.

December 18: Supplemental orders issued authorizing the Kansas City Long Distance Telephone Co.; the Missouri Central Telephone Co.; the Boonville Telephone Co., of Boonville; the Cass County Telephone Co., of Harrisonville; the Pattonsburg Home Telephone Co., of Pattonsburg; and the Buffum Telephone Co. to continue in effect present schedules of rates for a further period of 13 months.

NEBRASKA.

December 20: In the matter of the application of the Arnold Telephone Co., of Arnold, for permission to charge 25 cents a month additional for desk sets; adjudged reasonable, and permission granted.

December 20: In the matter of the violation by the Ansley Telephone Co., of Ansley, of the law requiring all rates to be approved by the commission before being put into effect; it appearing to the commission that the violation was not intentional, and as since then a proper application was made and increased rates granted, complaint dismissed as satisfied. The company had increased rates on its own initiative, and when summoned before the commission, the officials said they had interpreted the Burleson rules, when under government control, to give them the right to charge the maximum in that scale.

December 20: In the matter of the application of the Hamilton County Farmers' Association, of Aurora, for permission to continue emergency rates; it appearing that the 25 cents a month flat increase granted July 1, 1920 is not excessive, the commission ordered that the present schedule be continued for six months. The commission's order requires the company to set up a depreciation reserve.

December 21: Application filed by the Ohiowa Telephone Co., of Ohiowa, for permission to increase rates.

December 21: Application filed by the Nebraska Telephone Co. for permission to destroy certain accounts, records and memoranda.

December 22: In the matter of the application of the Northern Telephone Co. for permission to charge gross and net rates for business and residence service at its Creighton exchange, now charged on farm service; adjudged reasonable and permission granted to collect 25 cents more than net rate where payment is deferred beyond certain dates.

December 22: Application filed by the Blair Telephone Co., of Blair, for permission to make certain rate increases.

December 22: Application filed by the Madison Telephone Co., of Madison, for permission to declare a stock dividend.

NEW JERSEY.

December 10: Orders issued authorizing the continuance in effect of the Burleson war-time telephone rates in New Jersey with some slight modifications in the territory in northern New Jersey served by the New York Telephone Co., and denying the application of the Delaware & Atlantic Telegraph & Telephone Co., serving southern New Jersey, for an increase over the Burleson rates.

NEW YORK.

December 22: Complaint filed by the Common Council of Fulton against the Oswego County Independent Telephone Co. over rates and service, dismissed, the commission retaining the right for a reopening of the hearing.

OKLAHOMA.

December 17: Order issued authorizing Clyde J. Taylor, operating rural telephone lines in the vicinity of Chandler, to charge a uniform rate of $18 per station, per annum, effective January 1.

December 22: Final hearing at Oklahoma City on application of the Southwestern Bell Telephone Co. for authority to increase rates in Oklahoma City.

OREGON.

December 21: Hearing at Portland on application of the Pacific Telephone & Telegraph Co. for authority to increase rates.

PENNSYLVANIA.

December 11: Complaint of R G. Gillespie, of Pittsburgh, against the Bell Telephone Co. of Pennsylvania, alleging poor service between Pittsburgh and Cairo, West Va., dismissed, the commission holding that the complaint is one over which it has no jurisdiction and one which should be placed before the Interstate Commerce Commission.

December 15: The Bell Telephone Co. of Pennsylvania, ordered to file a tariff governing private branch exchanges, in which rates and charges are to be clearly and specifically defined.

December 15: Notice filed by the Enterprise Telephone & Telegraph Co. and the Pennsylvania State Telephone & Traffic Association of a reduction in telephone rates between Gap and New Holland and between Lititz and Leola from ten to five cents.

SOUTH CAROLINA.

December 8: Application filed by the Southern Bell Telephone & Telegraph Co. for authority to increase rates slightly over 25 per cent throughout the state.

WISCONSIN.

December 10: The McKinley Telephone Co., of Cumberland, authorized by the commission to increase rates.

December 14: Application of the Cuba City Telephone Exchange, of Cuba, for authority to increase rates dismissed.

December 20: Complaint of Glenon C. Webb against the Clark County Telephone Co. dismissed, the commission finding that a sufficient number of subscribers could not be secured to justify the operation of an exchange at Curtiss.

December 20: The Farmers' Lake Shore Telephone, Traction & Electric Power Co., of Algoma, the Junction City Rural Telephone Co., of Junction City, the Goodrich Telephone Co., of Goodrich, and the Farmers' Telephone Co., of Beetown, authorized to increase rates.

# "Telephony's" Home Study Course for Telephone Men

*A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell*

**Quiz Questions on the Preceding Installment.**

1391. Referring to Fig. 315, explain how the operation of multiple contact relays *F* and *M* is brought about. Can you explain the relation of multiple contact relay *M* to its associated connecting trunk equipment? Trace the circuit over which energizing current for multiple contact relay *M* flows.

1392. What relay operation selects contacts of multiple contact relay *M* by connecting them to the positive or grounded terminal of the common battery? How many multiple contact relays *M* must be provided for each trunk equipment? How many multiple contact relays L must be provided for each trunk equipment having access to 100 subscribers' line circuits? Can you state how many would be required if each trunk equipment was to be arranged for access to 120 subscribers' line circuits? What is your explanation of the operating function of multiple contact relay M?

1393. Explain how the operation of one multiple contact relay *L* and one relay *N* will be certain to result in the connection of the calling subscribers' line circuit to one trunk. Give an illustration of an actual line selection by enumerating the relays that will be operated and their relation to each other. Explain why only one multiple contact relay *L* and one relay *N* can be operated as the result of the receipt of any one call.

## CHAPTER XXXIII. Operating Combinations Including Switches (Continued).

1394. *Subsequent stages in complete call.*—The type of line-finder selection which has been described and which is shown, schematically, in Fig. 315 is adaptable for mechanical equipment as well as for manual equipment insofar as the subsequent stages of the complete call are concerned.

It is obvious that the three trunk conductors *X*, *Y* and *Z*, (Fig. 315) may be connected with the tip ring and sleeve of a manually operated cord and plug to be used in conjunction with some form of multiple. In such a case the arrangement would obviously be a form of call-distributing equipment, and should be compared with the equipment shown schematically in Fig. 306 in which the conventional type of line switch is used. It is obvious, however, that the circuit relations existing in the equipment represented in Fig. 315 are those of the line-finder diagramatically shown in Fig. 303.

Referring to Fig. 315, should the trunk conductors, *X*. *Y* and *Z* be connected with the three strands of a manually operated cord, the normally open make contact *BB* will be operated when the plug connected with the trunk conductors *X*, *Y* and *Z* is lifted from its seat in the plug board. Relay *AA*, shown without winding or winding connections, will be operated when the listening circuit between the trunk conductors *X* and *Y* and the operator's telephone instrument is completed.

By this combination a circuit is established which will permit current to flow through the windings of multiple contact relays *L* and *N* retaining their armatures in the operated position and maintaining the connection between the calling telephone line circuit and the connecting cord and plug. This circuit is traceable as follows:

1395. *Holding circuit for trunk relays.*—Starting at the positive or grounded terminal of the common battery, the current flows through the normally open

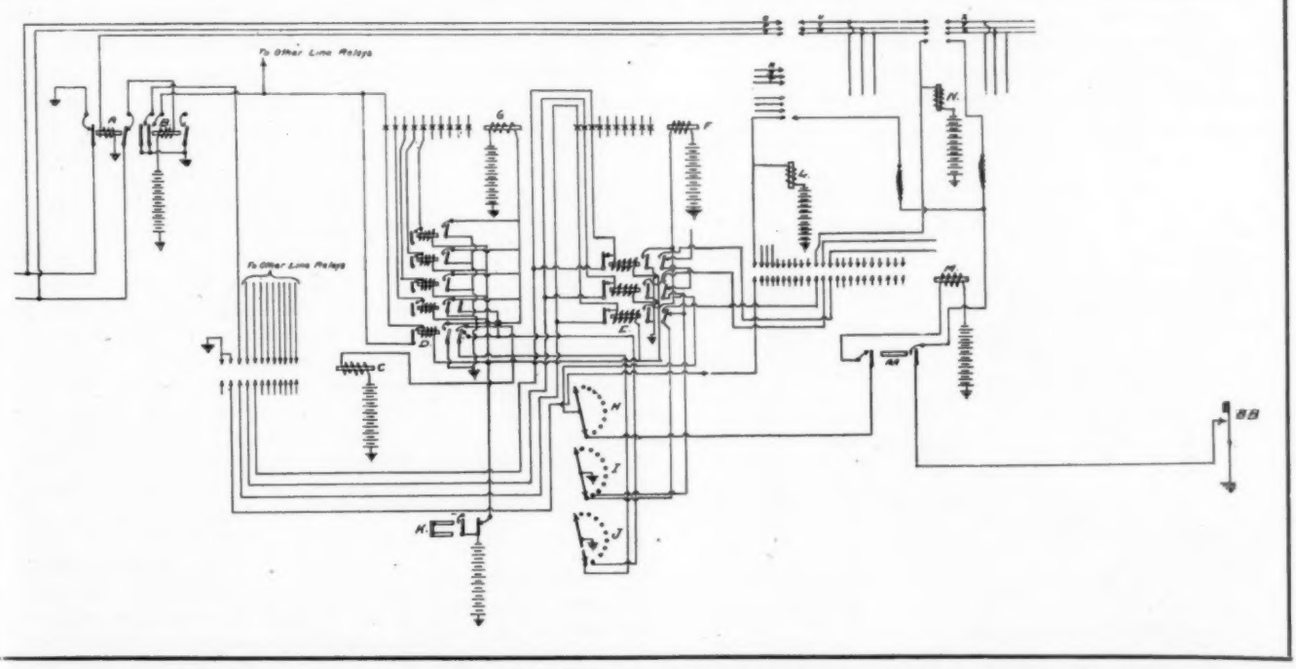



Fig. 315. General Schematic Circuit of One Method of Relay Selection Adapted to the Line-Finder Plan.

make contact *BB* (now closed), the normally open make contact of relay *AA* (now closed), the resistance coil, the normally open make contact of multiple contact relay *N* (now closed), the winding of relay *N* and the common battery.

A similar circuit is readily traceable through the winding of multiple contact relay *L*, a resistance coil, the normally open make contact of relay *AA* (now closed), and the normally open make contact *BB* (now closed), as well as a normally open contact of multiple contact relay *L*. It is obvious that the current will continue to flow over the circuit just traced and will retain multiple contact relays *L* and *N* in the operated position as long as relay *AA* is retained in the operated condition and normally open make contact *BB* is closed. Multiple contact relays *L* and *N*, however, will both be released whenever relay *AA* is released or the normally open make contact *BB* is restored to normal.

It is to be noted, also, that the operation of relay *AA* will interrupt the circuit over which energizing current is flowing to the winding of multiple contact relay *M*. Therefore, when relay *AA* is operated multiple contact relays *L* and *N* are held in the operated position and multiple contact relay *M* is released.

It is unnecessary to outline the many different possible arrangements that may be employed in the manually operated cord and plug portion of the equipment to secure the disconnect feature when the conversation is completed, or to signal the operator when manually operated listening keys are used. Any workable scheme to accomplish these purposes may be adopted without affecting the operation of the line-finder equipment as it has been described.

It is obvious that the control equipment, as distinguished from the connecting trunk equipment, must be released and rendered available for a succeeding call as soon as multiple contact relay *M* is released. The circuit arrangements by which this is accomplished will be described in a later section in which the type of line-finder equipment shown in Fig. 315 is described in connection with mechanical switching equipment for the succeeding stages in the completion of the call.

It is obvious, also, that the replacing of the calling telephone receiver upon its hook must bring about the release of multiple contact relays *L* and *N*. This is accomplished by circuit arrangements which effect the release of relay *AA* just as soon as the conversation is completed.

*(To be continued)*

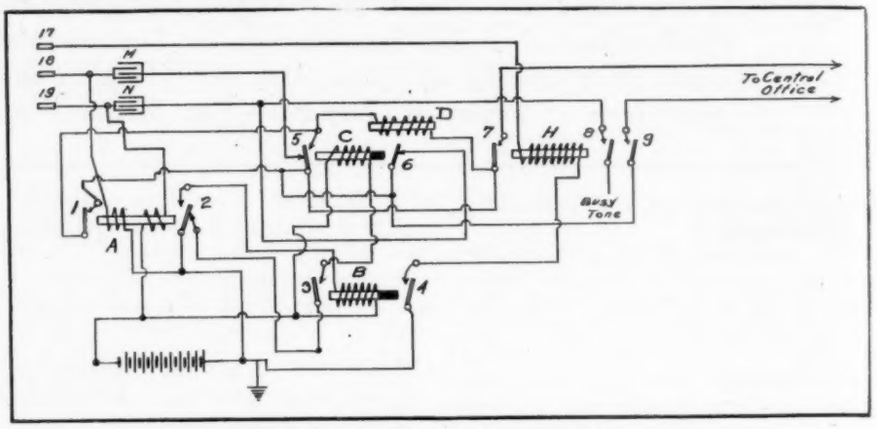



Fig. 303. Limiting Service Repeater.

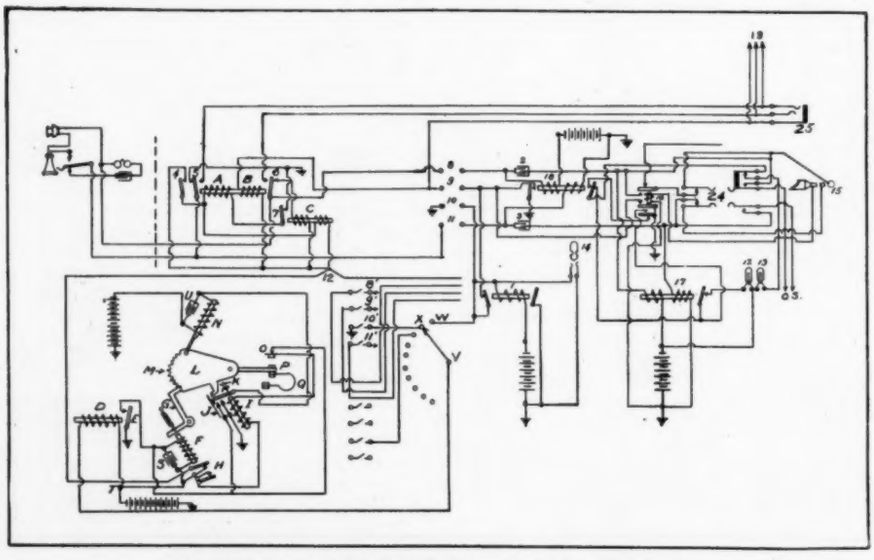


Fig. 306. Call Distributing Circuit for Line Switch.

## New Association Formed for Companies in Northern Iowa.

At a district meeting held at Emmetsburg, Iowa, on December 14, and attended by Independent telephone owners and managers, the question of forming an organization to take care of the problems of the companies in northern Iowa was brought up and discussed. It was decided to form a new organization, to be composed of officers who are financially interested in the telephone business. O. F. Ung presided as temporary chairman.

This new association will not work in opposition to the state association. There are many companies in northern Iowa who are not affiliated with any association, and it will be the purpose of this new association to help solve the problems of these companies. Uniform operating methods and legislative matters in the interests of Iowa companies are to be taken up by this organization.

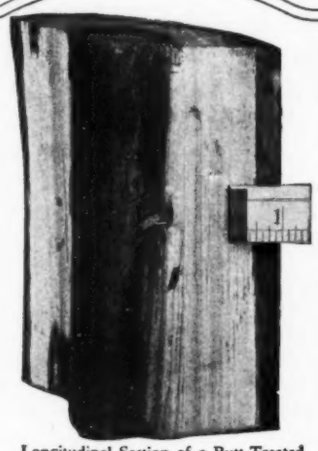
W. H. Daubendiek, of West Bend, Iowa, has been chosen president; Peter Eulberg, secretary, and P. P. Rogers, of Orange City, treasurer. The appointment of a committee on further organization was made, composed of the following: W. R. O'Brian, of Ayershire, chairman; O. F. Ung, of Harris; Peter Eulberg, of Alton; Miss Cagley, of Emmetsburg, and G. W. Johnson, of Linn Grove.

## Pennsylvania Telephone Men Plan Big Meeting Next Week.

Plans for making the convention of the Pennsylvania State Telephone & Traffic Association, to be held at Harrisburg, January 6-8, one of the biggest ever held, are going forward rapidly.

Again and again those in charge have been compelled to enlarge the exhibition space to make room for the large number of companies who are planning to exhibit their equipment. Products of a dozen factories will be under one roof and telephone men will be given an opportunity to compare the best of the different styles of equipment shown.

Men of national reputation will address the convention. The program includes an address by E. M. Prisk, of Hazelton, Pa., on "The Telephone Act of 1919," followed by a talk by John H. Wright, of Jamestown, N. Y., on the progress of the test case now before the supreme court. Gifford Pinchot, commissioner of forestry, will speak on a subject of vital interest to the telephone industry, "Where Will the Poles Come From?"



Longitudinal Section of a Butt-Treated Pole Showing ½ Inch Penetration.

# Guaranteed ½ Inch Uniform Penetration

THE P & H Guaranteed Penetration Process is revolutionary in the pole industry. It gives to pole users the first perfected Butt-Treating process that guarantees a uniform penetration of the preservative throughout the ground line area of the pole.

The specifications for the P & H Guaranteed Penetration Process are result specifications. ***The first of its kind in the history of the pole industry guaranteeing the result that pole buyers have wanted for years.***

On the end of every pole Butt-Treated by the P & H Guaranteed Penetration Process is countersunk the metal disc, showing that ½ inch uniform penetration of the preservative is guaranteed. In addition, with every shipment of poles the pole-buyer receives the written guarantee.

Behind these stands the reputation of Page & Hill Co., with their 19 years of success in the pole industry, and the largest and most completely equipped Butt-Treating plant in the world.

No other Butt-Treating process guarantees these results. Don't be satisfied with any but the P & H Guaranteed Penetration Process.

*Write for Full Particulars.*

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Butt-Treated BY PAGE & HILL Co 1920 GUARANTEED One-Half Inch PENETRATION

# How the Automatic "Carried On"

## Although Practically the Entire Inside and Outside Plant Forces Were on Strike for Seventy Days, the Citizens' Telephone Co., of Grand Rapids, Mich., Continued to Give Good Service to Its 18,000 Subscribers

By C. E. Tarte

*General Manager, Citizens Telephone Co., Grand Rapids, Mich.*

"There is only one thing that can make a strike effective in settling disputes between employers and employes, and that is stoppage of production, which usually means stoppage of revenue.

No organization can be guaranteed against disputes with its employes regarding wages and working conditions, but unless a strike brings about a stoppage of production, with consequent loss of revenue, or pressure exerted by inconvenienced patrons, no employer need have fear of a walk-out. He has nothing to lose."

The Citizens' Telephone Co. is in a position to realize very thoroughly the truth of the above statements, for today we look back upon a period when, through being able to maintain production substantially unimpared, we were not forced to accede to demands which, we are convinced, would have been disadvantageous to the telephone users of Grand Rapids, to the Citizens' Telephone Co., and in the long run, to our employes.

The past two or three years have been difficult ones for business organizations in general, and for public utilities in particular. The constantly increasing cost of living has made it necessary to grant higher wages to all classes of employes, while rates, being fixed by elaborate processes of application and hearings, have lagged behind the rising costs of operation, keeping the margin of profit languorously narrow.

The Citizens' Telephone Co. had given practical recognition to the necessities of the employes, and for several years past its scale of wages was as high as, or higher than, in other similar lines in this locality. But the company also recognizes its obligation to its subscribers, to hold operating costs at as low a figure as possible.

### New Wage Scale Presented.

Early in August a committee representing our inside and outside plant forces —operators, installers, switchmen, linemen, cablemen, etc.—presented a revised wage scale which would have increased our operating costs substantially two dollars per telephone per year. In view of the general downward trend of prices which was already beginning to make itself felt, we were not at all sure that such an increase in wages was needed by the men, and we did not think it would be just to pass such an increase on to our subscribers so long as any doubt remained on this point.

The Citizens' company has always operated on the open shop principle but has frequently engaged in "collective bargaining" with its employes, so that, after explaining our position to the committee, we offered to submit to arbitration the entire question of adequacy of wage and fairness of working conditions, and agreed to abide by the result.

### Emergency Crew Maintains Service.

The result of these conferences being unsatisfactory to the employes, they notified the company, on August 31, that unless their proposed scale was adopted, they would not report for duty on September 2. Practically the entire staffs of these departments failed to report for duty on that day, and for 70 days thereafter, over 14,500 lines of Strowger automatic equipment, our entire outside cable plant, and about 18,000 telephones were maintained and kept in service by a crew which, except for H. M. Collins, our superintendent of equipment, was composed largely of clerks, solicitors and officers of the company, who had had absolutely no previous technical experience and undertook duties for which they had had no training.

The commercial department was then drafted into the switchrooms; the secretary of the company, the auditor and the traveling auditor took charge of the three branch exchanges in the Grand Rapids area, while Mr. Collins with the assistance of three general office clerks, our magneto plant manager, one solicitor, one farmer and one metal polisher, handled the main exchange. All crews slept and had their meals in their respective switchrooms.

This condition continued for the first 23 days, when five men returned to work. These additional men were spread out to the best advantage, although only one of them was an experienced switchman. As the weeks passed we were also able gradually to build up an outside crew which began clearing the accumulation of cable and substation troubles.

The Grand Rapids system consists of a main exchange and three branches, North, East and South. There are just a few less than 18,000 telephones in the area. The equipment is of the three-wire Strowger automatic type, being installed during 1903, and was cut over from manual magneto to automatic in January, 1904.

The original installation consisted of 5,000 lines and additions have been made from time to time, so that there are now central office facilities for 14,500 lines. The first 5,000 lines have been in service 17 years, and the remaining 9,500 lines have been in operation an average of eight years.

In normal times our maintenance force will repair an average of 150 cases of plant and instrument trouble per working day, 30 of these being dry cell renewals, as we still operate about 8,000 local battery telephones. Until we could reconstruct an outside crew from such help as we could pick up locally and from our magneto plant managers, this trouble naturally accumulated and in the bulk looked rather formidable, but actually did not run very high.

One of our most serious difficulties was that during this time we found it very hard to convince our subscribers that we had no one to repair out-of-order telephones, as the service in general was practically normal.

Our traffic, ordinarily heavy, was still further increased because calling subscribers being unable to reach telephones that were out of service, called several times before abandoning the connection. This naturally placed an abnormally heavy load on the equipment, and further aggravated conditions.

### The Public Co-operates.

But after approximately 2,500 cable pairs were put out of commission through the cutting of cables and jumpers in terminal boxes, which brought the situation dramatically to public attention, our patrons came to understand the abnormal conditions and co-operated with us in every way possible, which was considerable help and gave us the moral support we needed.

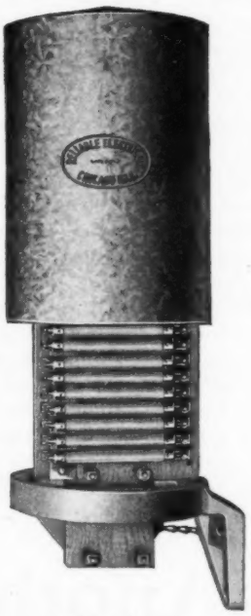
Two weeks were consumed in making the necessary temporary repairs to the cable plant, during which time our force had been built up to 40 men. Every available man was then put on troubles, telephones being changed when necessary, as we had only one experienced telephone repair man and he could adjust more instruments in the shop than by making trips in individual cases.

Owing to lack of staff it was impossible for us to keep anything like accurate

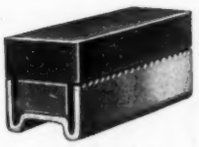
# A CABLE TERMINAL

## that will give Relief from Fuse Contact and Carbon Troubles

***Cable Compartment Air Tight***



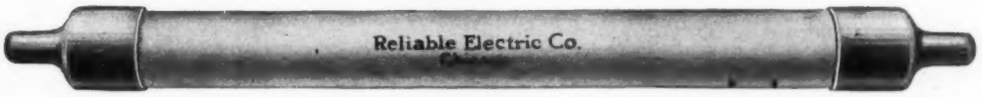
A 27-Cable Terminal



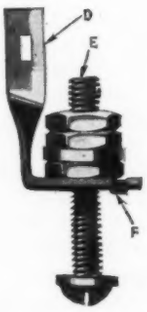
P 495

Equipped with Self Cleaning Discharge Blocks when specified.

## Fuse Clips That Bite Through Corrosion to the Clean Metal




**No. 27 Fuse—Full Size**




A. Contact points bite into fuse ends insuring good contact even if fuse end is corroded.

B. Cable soldering terminal is formed deep into slot to prevent turning.

C. Screw is soldered to cable wire terminal to insure perfect contact.

D. Fuse clips are readily removable.

E. Lock nut binding post for attaching drop wires.

F. Projection on fuse clip fits into groove to prevent turning.

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Reliable Electric Company

**3145 Carroll Ave., Chicago, U. S. A.**

records, but we estimate that during the whole time our service averaged 85 per cent of normal and this is borne out by the fact that for the three months of September, October and November, rebates for non-service ran only about 12 per cent of our billings.

During the early part of the difficulty very little attempt was made to make repairs in the central office equipment, because of the fact that most of the force taking care of the equipment was not experienced in this kind of work, most of them knowing nothing about handling a screwdriver, a pair of pliers, or a soldering iron. They were simply instructed to see that switches that were "off normal," on account of grounds or poor releases, were restored to normal, and also see that lines with grounds on them were disconnected at the rack until the grounds were cleared up.

Before the end of the ten weeks, however, these green men had reached the point where they could make necessary repairs on the automatic switches, and at the end of the period, the central office conditions were such that the company did not care particularly whether any of the switchmen came back or not. Those men who were taken back re-entered our employ as though they were new men. No grudges are held against them. The slate has been wiped clear, and we are thinking now only of the future.

**Apparatus Soon Restored to Normal.**

But one of the most remarkable things about the whole situation is the fact that after being practically entirely neglected so far as systematic maintenance is concerned, for a period of ten weeks, and receiving only the most superficial attention from inexperienced and inexpert hands, the entire Strowger apparatus was restored to normal within ten days after the regular staff returned to work, and today the equipment is none the worse for the experience.

During the sixth week of the period, our conditions were made more difficult by sympathetic movements on the part of our switchroom and outside forces in our automatic exchanges at Lansing, Holland, Battle Creek and Traverse City, and for five five weeks the whole burden of maintaining service fell on the local managers. Conditions at these exchanges were substantially the same as in Grand Rapids, and the results similar.

These ten weeks taught us nothing new about automatic operation. Our 16 years' experience with it in Grand Rapids, and up to ten years in five other exchanges, robbed us of any chance for surprises, even though much of the apparatus was in its 17th year of service, but perhaps it did give us a new realization of the difference between being dependent upon something that is *made*, and someone that is *paid*, to do its work.

There was plenty for the staff that stood by to do, but if, in addition, they had been called upon to give personal attention to every connection, we would have been powerless and the pressure of public opinion, prompted by the collapse of an essential community service, might have compelled us to make a settlement which would have been seriously unjust to all the interests involved.

# "One Good Turn Deserves Another"

## Exchange Manager Gives Good Service to His Subscribers and Receives Good Service From Others

By A Western Manager

Dull, gray skies, an occasional snowflake coming up to the window pane, as though anxious for the warmth inside, and then vanishing as though reminded of its duty, recalled to the manager that he must find out about the last order of line supplies. Such January weather portended the need of them. They had not been ordered long and there were vexatious transportation delays, but this manager knew from experience that the firm he ordered them from could and would get them to him just as fast as it was possible to do.

Dreary winter days are apt to be reflected in people's dispositions, so as the manager stepped into the office he had no idea in what a pleasant frame of mind he was presently to find himself. On the way, he passed the half opened door of the operating room, from which he heard the subdued voices of the chief operator and the three girls who were handling the mid-afternoon load. Before the new switchboard had been installed, he remembered, there were always six or seven operators at the board at this time.

His office man happened to be near the cashier's window as he came in and queried. "Heard anything from those supplies, Smith?"

A man outside the cashier's window, who had just been handed a receipted bill said, at the same time extending his hand, "I want to tell you of our appreciation of your telephone service. It's a pleasure to pay this bill."

Not so often does a telephone manager receive such expressions, or at such a time, and his answering smile was one of great pleasure.

"That's like finding a ten dollar bill in an old coat, Mr. Subscriber. We try to give the best service."

"I hardly see how you can do it at these rates."

"Just this way. We outgrew our old board, but we didn't outgrow it without realizing its 15 years of wonderful service-giving qualities, and so we wanted the new one to be of the same make.

"Besides that, we arranged an economical and practical apparatus, and so we bought the latest equipment of the same kind. In doing this, we kept down our plant investment. Had we bought the high-priced complicated equipment which does nothing but what our switchboard accomplishes, not as much in fact, we would have a total investment that would figure at perhaps $100 per station instead of $30. With this board we are able to cut our operator expense in half and still pay the girls we need higher wages."

"I can see that is a saving," said the man outside the wicket window.

"There are many electrical and mechanical advantages to our equipment," continued the manager, "but the big thing from your standpoint is that you get service—immediate and fast service all the time. With our telephone in your house, the mere lifting of the receiver gives you not only the highest class service at an economical rate, but you have what modern business and social life demand, the human element of service which gets you what you want in a telephone way in the quickest possible manner, and tells you why, when for any reason, it cannot be done."

"Well, it's the use of the telephone all over a town that tells the story, isn't it?" replied the telephone user. "The old saying about the proof of the pudding is true in the telephone business also, is it not?"

"Indeed it is," said the manager, picking up a little book from the counter and pointing to four words at the bottom of the last page, "that's the way the manufacturer says it. They sure do believe in the goods they sell."

And the subscriber read, as he turned to go: "Use is The Test."

"The station agent has just 'phoned, sir, that the supplies are here," said the clerk, as the manager returned to his desk.

"Fine!" he exclaimed. "We are getting good service as well as giving it."

# Item of Pertinent Interest

## ision

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nia, Pa.

prs. 22
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Cumber-

Cable, 20
ad Cov-

Cumber-

d Tele-
prs. 22

Cumber-

re, Md.

A. C. 150
ase.
gton,

tor Sets,

phia, Pa.

E-616
60 Switchboards, 3 wire, 25 KW, 250 volt.
Location — Schenectady, N. Y.

17894
199½ lbs. Rubber Tape, ¾" wide, ¼-lb. rolls, adhesive rubber, cloth back.
Location—Philadelphia, Pa.

3484
194,671 lbs. Copper Wire, hard drawn tinned No. 14, B & S, tw.pi. 3/64 R. S. B. W. P.
Location — Schenectady, N. Y.

E-1251
53,298 lbs. Plain Copper Wire, hard drawn steel, No. 7 gauge, low carbon.
Location—Pittsburgh, Pa.

3441
98 Resonators, 27 cu. ft., with racks and stands. Resonating board for holding telephone sounder with key; double swing arm and swiveled hood 10½ inches high, arm spread 15½", with message rack and stand. All parts finished in black Japan.
Location—Philadelphia, Pa.

## Central Division

10948
10 Desks, Chief Operator, No. 14, W. E. Complete with sundry type desks.
Location—Chicago, Ill.

969
1,550 Payout Reels, a horizontal frame with reels to be carried by two men for distributing wire.
Location—Hawthorne, Ill.

19050
6 Relay Rack Bays, SW 6 T 2279 33 GI.
Location—Chicago, Ill.

## Southwestern Division

968
110 Payout Reels.
Location — San Antonio, Texas.


RTMENT
ty Sales"

**MACHINERY AND ENGINEERING MATERIALS**

**LIST NO. 13**

***Sold by Negotiation***

## HOW TO ORDER

All orders and negotiations for materials offered in this list must be addressed to the Depot Quartermaster of the Division where material is located. These divisions and the addresses of controlling offices are given below. To obtain a complete list of materials not listed in this advertisement, clip and mail the attached coupon.

**List of Divisions and Controlling Offices**

**Eastern Division**
**59th St. and 1st Ave.**
**Brooklyn, N. Y.**

**Central Division**
**1819 West 39th St.,**
**Chicago, Ill.**

**Southern Division**
**Transportation Bldg.,**
**Atlanta, Ga.**

**Southwestern Division**
**San Antonio, Texas**

**Northeastern Division**
**Army Supply Base**
**Boston, Mass.**

**COUPON**

Chief, Sales Promotion Section, Office of the Director of Sales, Room 2515, Munitions Building, Washington, D. C.

**IMPORTANT**
**Mail Coupon to This Address**

Kindly send M. & E. M. List No. 13
.....in its entirety.
Firm Name .....
Street Address .....
City ..... State.....
Signed by .....
Telephony

# From Factory and Salesroom

Conventions: Penna., Harrisburg, Jan. 6-8; Minn., St. Paul, Jan. 25-27; Kans., Salina, Feb. 1-3.

### Fowle & Cravath Succeeded by Frank F. Fowle & Co.

Owing to the ill health of one of his family, James R. Cravath finds it advisable to move his residence to California, and therefore the firm of Fowle & Cravath, Monadnock Block, Chicago, has discontinued business.

However, the new firm of Frank F. Fowle & Co. will continue the business at the same address, covering the field of electrical and mechanical engineering as heretofore. The advisory services of Mr. Cravath in illuminating engineering matters will still be available, as he will retain a connection with the new firm for that purpose.

### New Cook Electric Salesman for Ohio and Eastern States.

D. C. McKee, who recently entered the employ of the Cook Electric Co., of Chicago, as traveling salesman, is fast making friends in the telephone industry in Ohio and Eastern states.

Although new in the telephone field, Mr. McKee has had a long and extensive experience as a salesman of mechanical and electrical goods. His headquarters are in Pittsburgh, Pa., and his home address is 206 Elysian street.

### Enters Field as Consulting Expert to Public Utilities.

The expert counsel of Horace F. Hill, until recently operating vice-president of the Chicago and Wisconsin telephone companies, is now available to public utility and industrial corporations. Terminating his long connection with the Bell companies in the Middle West, Mr. Hill has opened offices in Boston, Mass., as consulting expert, devoting particular attention to the establishment of right relations between capital, management, labor and the public.

The industrial work at the present time needs a good diagnostician, in Mr. Hill's opinion. He favors increased production with the retention of the present wage scales. Attention is directed by Mr. Hill to the fact that while the wages of bricklayers, for instance, have practically doubled, the average workman at the present time lays 700 bricks as compared with 1,200 to 1,300 formerly.

Mr. Hill's resignation from the office of operating vice-president of the Chicago and Wisconsin companies, to enter the field as a consulting expert, came after more than 26 years of faithful and efficient service with the Bell companies in executive capacities.

Born in Boston in 1860, he received a common school education and entered the postal service in 1877, rising to the rank of chief clerk of the Boston post office. In 1892 he went with the American Telephone & Telegraph Co., four years later

D. C. McKee, New Salesman of Cook Electric Co.

being appointed general superintendent of the Long Lines Department.

In 1903 Mr. Hill became general manager of the Central Union Telephone Co., with headquarters in Chicago. The headquarters were later moved to Indianapolis, Ind., and in 1907 he was elected vice-president, retaining also the title and duties of general manager.

Indiana, Ohio and Illinois, the three states in which the Central Union then operated, comprised the center of the bitterest competitive struggle in those days. Through an exceedingly stressful period fraught with difficulties, Mr. Hill directed the affairs of his company in a commendable manner and won the respect of his competitors.

Horace F. Hill, Able and Experienced Telephone Man Offers Services to Utilities as Consulting Expert.

The Bell System was re-arranged in 1911 and in the reorganization process was formed the Central Group of Bell telephone companies, comprising the Chicago, Wisconsin, Michigan State, Central Union and Cleveland telephone companies. Headquarters of the group were established in Chicago and Mr. Hill was appointed general manager, in charge of plant, traffic and engineering work.

Upon a re-arrangement of the group organization, in 1912, Mr. Hill became general manager of the Chicago Telephone Co. and the Illinois division of the Central Union Telephone Co. He served in this capacity until April 1, 1914, when he was elected vice-president in charge of operation of the Central Group companies, from which position he resigned September 30, 1920.

### The Index for Volume 79 of TELEPHONY.

The index for Volume 79 of TELEPHONY, which was completed with the issue of December 25, 1920, is now ready for distribution among those who keep complete files of TELEPHONY. In this index are listed all the important articles which have appeared between July 3 and December 25, 1920. It will be supplied free of charge to those making application.

### Changes in Standard Underground Pacific Coast Staff.

The Standard Underground Cable Co., of Pittsburgh, Pa., announces the following changes in its Pacific Coast staff:

Richard G. Harris succeeds as Pacific coast manager, John P. Bell, who will hereafter devote his time to the growing demands of his export and import business.

Mr. Harris has been connected with the Standard organization since 1909, when he was a member of the staff of the general offices of the company at Pittsburgh, and on special development matters at its Perth Amboy, N. J., factories, and later sales engineer with the New York office of the company. For the past eight years he has been manager of the Montreal office territory of the Standard Underground Cable Co. of Canada, Ltd.

# Exide
**BATTERIES**

The history of the storage battery industry is largely a story of Exide achievement. In the field of telephone work, the Exide has become almost universal—it is used by the leading telephone companies of the world.

## THE ELECTRIC STORAGE BATTERY CO.

*Oldest and largest manufacturers in the world of storage batteries for every purpose*

1888 PHILADELPHIA 1921

Branches in 17 Cities

Exide Batteries of Canada, Limited, 133-157 Dufferin St., Toronto, Canada

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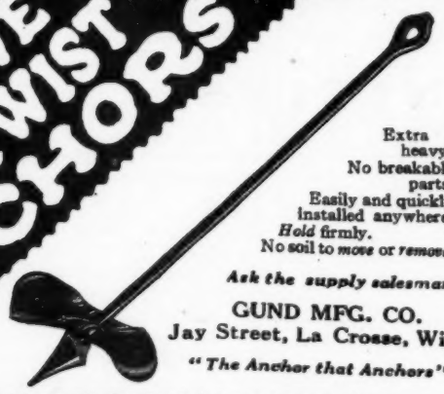
## DRIVE & TWIST ANCHORS



Extra heavy.
No breakable parts.
Easily and quickly installed anywhere.
*Hold* firmly.
No soil to *move* or *remove*.

*Ask the supply salesman!*

GUND MFG. CO.
Jay Street, La Crosse, Wis.

*"The Anchor that Anchors"*

---

## Why sacrifice your old equipment for new?

Don't imagine that because some of the parts are commencing to wear that you must replace.

"We can save you money" because we can repair your apparatus—or replace worn out parts, and will guarantee you satisfaction.

At least when you are situated that it must either be "old" or "new" apparatus let us show how the old can be continued serviceable. Pack up your parts, whether one or twenty pieces, and ship to the

**Suttle Equipment Company**
**Olney, Ill.**

---

*Send for Catalogue*

## "Cope"

*Established 31 Years*

For

**Underground Specialties**

Cope's Instantaneous Coupling Rod

**Cable Racks** **Conduit Rods**
**Bond Plates** **Brass Screw Rods**
**Winches** **Bond Wire**
**Guard Rails** **Cable Reel Jacks**
**Linemen's Belts and Safety Straps**
**etc.. etc.**

## T. J. Cope

**Manufacturer of Underground Equipment and Tools**

**1620 Chancellor St., Philadelphia, Pa.**

REPRESENTATIVES
The Electric Material Co., 589 Howard St., San Francisco, Cal.
Chas. Farnham, 207 I. W. Hellman Bldg., Los Angeles, Cal.
Consumers' Supply Co., Regina, Sask., Canada.

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## The Old and the New

"Going! — going! — gone!!" — that's the story of overhead wires and cables. In up-to-date cities they're *gone*. And this picture shows another where they're *going* — down underground in

**ORANGEBURG**
**Fibre Conduit**

*Get Book H.*

**THE FIBRE CONDUIT CO.**
**ORANGEBURG, N. Y.**
New York Boston Chicago San Francisco

His experience, together with his training as an electrical engineer, qualifies him for efficient and experienced representation and management of the Standard company's interests on the coast.

Vinton Smith, who has been connected for several years with the San Francisco office staff, has been appointed assistant Pacific coast manager.

W. G. Stearns, also for many years with the company on the Pacific coast, has been appointed special sales agent.

## Joins Line Materials Division of Matthews & Brother.

E. H. Boss has joined the sales force of the Line Materials Division of W. N. Matthews & Brother, Inc., of St. Louis, Mo., and will have charge of the territory formerly covered by Warren M. Heim, resigned.

Mr. Boss has had wide experience in electrical transmission work. From 1890 to 1899 he was connected with the Bell Telephone Co. of Canada. He was manager of the Niagara Falls (Canada) plant at the time he joined the Niagara, St. Catharines and Toronto Railway Co. in 1899.

In 1900 Mr. Boss entered the employ of the Hudson Valley Railway Co., Glens Falls, N. Y., in charge of construction and maintenance of transmission, lighting, railway, telephone, telegraph and signal systems. In 1903 he entered the employ of the Connecticut Railway & Lighting Co. in charge of construction and maintenance of transmission. He remained with the New York, New Haven and Hartford holdings until 1914.

In 1914 he accepted an offer from the American Public Service Co. in Texas and Oklahoma as superintendent of construction, transmission and distribution systems, which position he held at the time of joining W. N. Matthews & Brother, Inc., of St. Louis, Mo. Mr. Boss is 46 years of age.

## New Telephone Company Organized at Breckenridge, Texas.

The Oil Field Telegraph & Telephone Co. has been organized at Breckenridge, Texas, with G. O. Bateman, president; M. J. Lewis, treasurer, and R. L. Moore, manager. It is announced that a charter has been granted.

It is the intention of the new company to build a telephone and telegraph line from Breckenridge to Ivan, Eliasville, South Bend, and Graham, Texas. The line will be about 45 miles in length and is expected to be in operation in 30 days

# OPPORTUNITIES

### RECONSTRUCTED EQUIPMENT

| | |
|---|---|
| Dean Elec. No. 1470 C. B. desk sets (bal. coil or D.C. type) complete with straight line steel signal sets @..... | $6.75 |
| Dean Elec. Stand, same as above, complete less signal sets, @..... | 5.00 |
| International or Am. Elec. 3-bar 80 ohm series compacts, @..... | 6.75 |
| International or Am. Elec. 3-bar 1600 ohm Bdg. compacts, @..... | 7.50 |
| Dean Elec. 3-bar 1600 ohm Bdg. compacts @ ..... | 8.50 |
| Kellogg, Dean or Monarch 100 ohm series combine line drops and jacks, per strip of 5, @..... | 6.50 |
| Monarch, Dean or Leich Local or C. B. transmitters complete, @..... | .85 |
| Kellogg No. 15—½ M. F. Condensers @ | .35 |
| Kellogg or Dean Ring off Drops, per strip of 5 @..... | 5.00 |

**REBUILT ELECTRIC EQUIPMENT COMPANY, Not Inc.**
E. C. Stoeffhaas, Gen'l Mgr.
2157 W. 21st Street, CHICAGO, ILL.
We are not connected with or successors to Rebuilt Telephone Equip. Co.

(Continued from Page 43)

## HELP WANTED

WANTED—Wire Chief—man qualified by experience and past record to handle troublemen, testers and office records of Trouble Dept. Must be able to furnish A-1 reference as to ability to secure results. Address 4461, care of TELEPHONY.

WANTED—Manager for small telephone company in Central Illinois, operating two magneto exchanges a few miles apart. Address Secretary, 604 Joliet National Bank Bldg., Joliet, Ill.

## FOR SALE

FOR SALE—1 section No. 101 Reliable Electric Main Distributing Frame. 125 lines. First-class shape; has only been used 3 years; $75 buys the complete outfit if taken soon. Address Avon Tel. Co., Avon, Illinois.

## WANTED

WANTED TO PURCHASE—Telephone Exchange in Michigan of 200 stations with toll connections. Address 4470, care TELEPHONY.

ROEBLING
Double Galvanized
TELEPHONE WIRE
E. B. B., B. B. and Steel Grades
John A. Roebling's Sons Co., Trenton, N. J.

COPPER CLAD STEEL COMPANY
OFFICE AND WORKS: RANKIN, PA. BRADDOCK P. O.
WESTERN SALES REPRESENTATIVES: STEEL SALES CORPORATION, CHICAGO, ILL.
NEW YORK SALES OFFICE: 30 CHURCH STREET, NEW YORK CITY
"Copperweld"—a copper conductor with the strength of steel. Cheaper, better, stronger than copper wire

NORTHERN-WESTERN
CEDAR POLES
A FULL ASSORTMENT OF SIZES
PROMPT SHIPMENTS ASSURED
T. M. PARTRIDGE LUMBER COMPANY
Lumber Exchange MINNEAPOLIS

CEDAR POLES
NORTHERN or WESTERN
Plain or Butt Treated
THE VALENTINE-CLARK COMPANY,
SPOKANE, WASH.
Toledo Chicago Minneapolis

Duluth Log Company
POLE SERVICE
Duluth, Minnesota

CEDAR POLES
SHIPMENTS AS ORDERED
THE MAC GILLIS & GIBBS CO. MILWAUKEE WIS.

THE B-R ELECTRIC COMPANY, Kansas City, Mo.
Telephone Construction Material, Equipment and Supplies
Distributors
LEICH Telephones, Switchboards and Ringing Machines

NORTHERN CEDAR POLES WESTERN
BUTT-TREATING GUARANTEED GRADES
BELL LUMBER COMPANY, MINNEAPOLIS, MINN.